

AD-A156 160

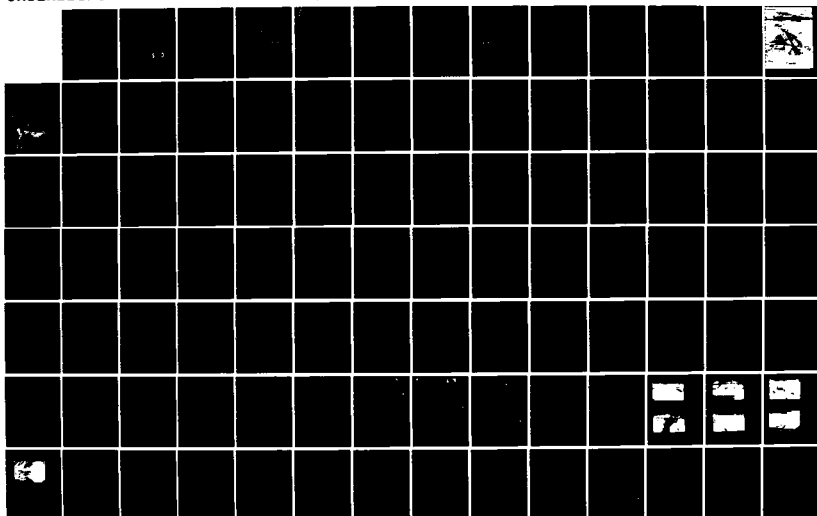
NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS  
POWDERMILL BROOK DETE. (U) CORPS OF ENGINEERS WALTHAM  
MA NEW ENGLAND DIV AUG 78

1/1

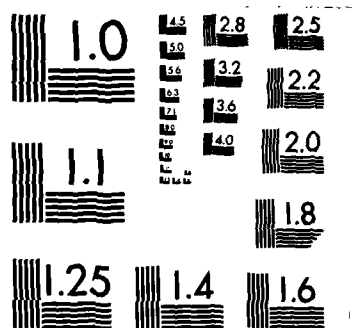
UNCLASSIFIED

F/G 13/13

NL







MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A



AD-A156 160

CONNECTICUT RIVER BASIN  
WESTFIELD, MASSACHUSETTS

POWDERMILL BROOK  
DETENTION DAM  
MA 00605

PHASE I INSPECTION REPORT  
NATIONAL DAM INSPECTION PROGRAM



DTIC  
ELECTE  
JUN 20 1985  
S D  
G

DEPARTMENT OF THE ARMY  
NEW ENGLAND DIVISION, CORPS OF ENGINEERS  
WALTHAM, MASS. 02154

DTIC FILE COPY

AUGUST 1978

DISTRIBUTION STATEMENT A  
Approved for public release  
Distribution Unlimited

85 5 28 236



UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER  MA 00605	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle)  Powdermill Brook Detention Dam  NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS		5. TYPE OF REPORT & PERIOD COVERED  INSPECTION REPORT
7. AUTHOR(s)  U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DIVISION		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS DEPT. OF THE ARMY, CORPS OF ENGINEERS NEW ENGLAND DIVISION, NEDED 424 TRAPELO ROAD, WALTHAM, MA. 02254		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		12. REPORT DATE August 1978
		13. NUMBER OF PAGES 54
		15. SECURITY CLASS. (of this report)  UNCLASSIFIED
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report)  APPROVAL FOR PUBLIC RELEASE: DISTRIBUTION UNLIMITED		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number)  DAMS, INSPECTION, DAM SAFETY,  Connecticut River Basin Powdermill Brook Westfield, Massachusetts		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number)  / The dam is a 642 ft. long, 60 ft. high earth embankment flood retention dam. The visual inspection did not disclose any findings that indicate an immediate unsafe condition. The dam is generally in good condition. It should be assured that the gate on the intake structure is in good working order. Barriers should be installed to prevent further intrusion by motorized vehicles.		



## **DISCLAIMER NOTICE**

**THIS DOCUMENT IS BEST QUALITY  
PRACTICABLE. THE COPY FURNISHED  
TO DTIC CONTAINED A SIGNIFICANT  
NUMBER OF PAGES WHICH DO NOT  
REPRODUCE LEGIBLY.**





DEPARTMENT OF THE ARMY  
NEW ENGLAND DIVISION, CORPS OF ENGINEERS  
424 TRAPELO ROAD  
WALTHAM, MASSACHUSETTS 02154

REPLY TO  
ATTENTION OF  
NEDED

Honorable Michael S. Dukakis  
Governor of the Commonwealth of  
Massachusetts  
State House  
Boston, Massachusetts 02133

DEC 20 1978

Dear Governor Dukakis:

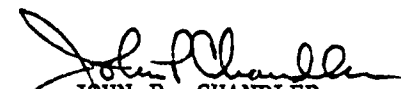
I am forwarding to you a copy of the Powdermill Brook Dam Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. This report is presented for your use and is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. A brief assessment is included at the beginning of the report. I have approved the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is a vitally important part of this program.

A copy of this report has been forwarded to the Department of Environmental Quality Engineering, the cooperating agency for the Commonwealth of Massachusetts. In addition, a copy of the report has also been furnished the owner, the City of Westfield, Massachusetts, Flood Control Commission, City Hall, 59 Court Street, Westfield, Massachusetts 01085.

Copies of this report will be made available to the public, upon request, by this office under the Freedom of Information Act. In the case of this report the release date will be thirty days from the date of this letter.

I wish to take this opportunity to thank you and the Department of Environmental Quality Engineering for your cooperation in carrying out this program.

Sincerely yours,

  
JOHN P. CHANDLER  
Colonel, Corps of Engineers  
Division Engineer

Incl  
As stated



NATIONAL DAM INSPECTION PROGRAM  
PHASE I INSPECTION REPORT  
BRIEF ASSESSMENT

Identification No.: MA 00605  
Name of Dam: Powdermill Brook Detention Dam  
City: Westfield  
County and State: Hampden County, Massachusetts  
Stream: Powdermill Brook  
Date of Inspection: May 31, 1978

This dam is a 642 foot long, 60 foot high earth embankment flood retention dam. Just beyond the easterly abutment there is a 260 foot wide vegetated spillway cut through natural ground. The dam was designed in 1962 by the Soil Conservation Service of the U.S. Department of Agriculture. The official contract for construction was let by the "Commonwealth of Massachusetts Water Resources Commission" also in 1962. The dam is operated and maintained by the City of Westfield by formal agreement with the Soil Conservation Service.

The visual inspection did not disclose any findings that indicate an immediate unsafe condition.

Based on size and hazard classifications in accordance with Corps guidelines, the test flood is the Probable Maximum Flood. The spillway for this dam is capable of passing the PMF without overtopping of the dam.

Indepth engineering data was made available by the Soil Conservation Service office in Amherst, Massachusetts.

This dam is in generally good condition. It is felt, however, that certain items which are generally normal maintenance and operational procedures need attention.

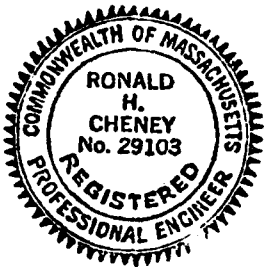
It should be assured by the owner that the gate on the intake structure is in good working order. Also the erosion

Powdermill Brook



channels on the embankment caused by vehicular traffic should be repaired. Barriers should be installed to prevent further intrusion by motorized vehicles.

Although there is no immediate urgency to these recommendations, they are basically normal maintenance and operational procedures. Therefore they should be addressed within one year after the receipt of this report.



*Ronald H. Cheney*  
Ronald H. Cheney, P.E.  
Associate

Hayden, Harding & Buchanan, Inc.  
Boston, Massachusetts

Accession For		
NTIS GRA&I <input checked="" type="checkbox"/>		
DTIC TAB <input type="checkbox"/>		
Unannounced <input type="checkbox"/>		
Justification		
By		
Distribution/		
Availability Codes		
Dist	Avail and/or Special	
A/1	23	CAV





This Phase I Inspection Report on the Powdermill Brook Detention Dam has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgment and practice, and is hereby submitted for approval.

*Charles G. Tiersch*

CHARLES G. TIERSCH, Chairman  
Chief, Foundation and Materials Branch  
Engineering Division

*Fred J. Ravens, Jr.*

FRED J. RAVENS, Jr., Member  
Chief, Design Branch  
Engineering Division

*Saul Cooper*

SAUL COOPER, Member  
Chief, Water Control Branch  
Engineering Division

APPROVAL RECOMMENDED:

*Joe B. Fryar*

JOE B. FRYAR  
Chief, Engineering Division

SEP 21 1978



## PREFACE

This report is prepared under guidance contained in Department of the Army, Office of the Chief of Engineers, Recommended Guidelines for Safety Inspection of Dams, for a Phase I Investigation. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external



ditions, and is evolutionary in nature. It would be correct to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.



## TABLE OF CONTENTS

	<u>PAGE</u>
LETTER OF TRANSMITTAL	
BRIEF ASSESSMENT	
VIEW BOARD SIGNATURE SHEET	
REFACE	
TABLE OF CONTENTS	
INTERVIEW PHOTOS	
LOCATION MAP	
REPORT	
SECTION 1 - PROJECT INFORMATION	1
1.1 General	1
1.2 Description of Project	1
1.3 Pertinent Data	4
SECTION 2 - ENGINEERING DATA	7
2.1 Design	7
2.2 Construction	7
2.3 Operation	7
2.4 Evaluation	7
SECTION 3 - VISUAL INSPECTION	8
3.1 Findings	8
3.2 Evaluations	10



	<u>PAGE</u>
SECTION 4 - OPERATIONAL PROCEDURES	11
4.1 Procedure	11
4.2 Maintenance of Dam	11
4.3 Maintenance of Operating Facilities	11
4.4 Description of Warning System	11
4.5 Evaluation	11
SECTION 5 - HYDRAULIC/HYDROLOGICAL	13
5.1 Evaluation of Features	13
SECTION 6 - STRUCTURAL STABILITY	14
6.1 Evaluation of Structural Stability	14
SECTION 7 - ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES	15
7.1 Dam Assessment	15
7.2 Recommendations	15
7.3 Remedial Measures	15
APPENDICES	
Appendix A - Visual Inspection Check List	
Appendix B - Engineering Data-Past Inspection Reports-Plans	
Appendix C - Photographs	
Appendix D - Computations-Drainage Area	
Appendix E - Information as Contained in the National Inventory of Dams	







SECTION 5  
HYDRAULIC/HYDROLOGIC

Evaluation of Features

a. Design Data

Complete hydraulic design information was furnished the Soils Conservation Service and reviewed. This information revealed that the dam was designed for the retention of 100 year frequency flood. The August 1955 flood, which was greater than a 500 year frequency storm for this area, was also routed through this facility, concluding that this storm would not endanger the structure.

b. Experience Data

Maximum impoundments and spillway flows to date were made available. This facility has been designed for the retention of a 100 year frequency storm. As such, and being built in 1962, the amount of water having passed the spillway, if any, is probably small.

c. Visual Observations

Visual observations of the drainage area and general vicinity of the dam show them to be in general agreement with the area U.S.G.S. map. A description of the drainage area is given in Section 1.3a of this report.

d. Overtopping Potential

This dam carries an intermediate classification for size with a high hazard potential. As such it should be capable of passing a PMF. This test flood was computed by checking the drainage area supplied by the Soil Conservation Service and using SCS discharge design curves. A PMF inflow of 9775 cfs (2130 csm) was developed and resulted in an outflow of 9492 cfs (2068 csm) at elevation 200.5±. Since the top of this dam is at 202.0, this dam will not overtop.



tion 4.5 Continued

spassing are not now affecting the safety of the dam, it  
uld not be allowed to continue indefinitely.



SECTION 4  
OPERATIONAL PROCEDURES

1 Procedures

Being a flood retention dam with only a single intake structure, there are no indepth operating procedures required.

the gate on the 36" intake is closed, than a pool to elevation 163.0, top of side wall weir elevation, will be maintained. With the gate open, the pool will be negligible.

2 Maintenance of Dam

By agreement with the Soil Conservation Service and the City of Westfield, it is the city's responsibility to maintain this dam. At the time of inspection, there was a good cover of turf on both the upstream and downstream slopes. It was evident however, that trespassing on these slopes by motor bikes, and in the case of the crest of the dam, four wheel vehicles, was taking place unimpeded.

3 Maintenance of Operating Facility

The Soils Conservation Service inspection report of May 12, 1977 indicated that the gate on the intake structure was damaged and needed repair. This was not inspected due to the water surrounding the structure as noted in Section 3.lc. The wheel used to operate this gate is stored at the Public Works Garage, South Road Street, in Westfield. The safety of this dam does not rely on the functioning of this gate since the difference between the water level invert of 157.5 and the side wall weirs 163.0 is only 5.5'. Therefore the retained pool is small.

4 Description of Warning Systems

There are no warning systems associated with this dam.

5 Evaluation

Generally this dam appears in good condition. The annual inspection by the Soil Conservation Service along with city personnel appears to keep on top of maintenance requirements. Trespassing by motor bikes and/or four wheel vehicles should not, however, be allowed. Although the eroded paths created by this



## Section 3.2

### 3.2 Evaluation

Visual examination indicates no immediate safety problems; however, erosion caused by motor bikes and other vehicles should be repaired. Barriers should be erected to discourage continued vehicular traffic on the dam and in the spillway



### Section 3.1 Continued

Motor bikes have caused erosion on the dam face from the toe to the crest as can be seen in Photo3.

No seepage or damp areas were observed along the toe.

#### c. Appurtenant Structures

The intake structure was inspected from the water surface up. There is no service bridge to this intake and water surrounds it when the 36" diameter intake is closed or partially open. The structure was therefore examined from a distance of about 6 feet. The structure appeared to be in good condition with water flowing freely over the weirs. The 48" diameter outlet pipe was flowing freely.

The emergency spillway is a vegetated spillway with soil slope training walls. In general the spillway is in good condition. There has been local erosion as a result of motor bike traffic. The area of particular concern is the slope adjacent to the left abutment as shown in Photo 4.

Small trees on the periphery of the spillway entrance and exit should be kept under control.

#### d. Reservoir Area

The normal amount of water retained behind this structure is quite small. Being solely a flood retention dam, only under periods of heavy precipitation is there a significant pool retained. The description of the drainage area is given in Section 1.3a of this report.

#### e. Downstream Channel

The downstream channel flows for about 300' in open area then becomes wooded. There is some grass growing in the channel bottom and a small amount of wooded debris can be found downstream. The channel is, however, flowing freely. This can be seen in Photos 6 and 7.



SECTION 3  
VISUAL INSPECTION

3.1 Findings

a. General

The Phase I inspection of this dam was made on May 31, 1978. The water behind the dam at that time was equal to the sidewall weirs, elevation 163.0, of the intake structure. The upstream slope and the intake structure were inspected above the water level.

b. Dam

Visual inspection of the embankment showed no signs of distress.

Upstream Slope

There is essentially no pool behind the dam and the entire upstream face was inspected. In general the slope is well turfed and in good condition. There has been trespassing on the slope by motor bikes which have caused erosion gullies to be formed.

Crest

The crest of the dam has no pavement. Vehicular traffic has caused erosion on the crest which can be seen in Photos 1 and 2\*. The erosion is very bad at the left end of the crest where it contacts the spillway slope. This area is shown in Photo 2.

Downstream Slope

The face of the slope was traversed at the toe along the berm which is approximately midheight and along the crest.

In general the slope is in good condition and with the exception of areas of trespass there is good turf and grass cover.

\*See Appendix C for these and all subsequent photos.



SECTION 2  
ENGINEERING DATA

2.1 Design

This dam was designed by the "Soil Conservation Service" of the U.S. Department of Agriculture. Construction drawings, design calculations and construction specifications are dated 1962. All of the above indepth engineering data was made available through the Soil Conservation Service office in Amherst, Massachusetts.

2.2 Construction

Construction was started in 1962 with the official contract being let by the "Commonwealth of Massachusetts Water Resources Commission". Supervision was by the Soil Conservation Service and there have been no major changes to this site since that time.

2.3 Operation

This dam is maintained and operated by the City of Westfield through a formal agreement between the City and the Soil Conservation Service. The dam is inspected yearly by the Soil Conservation Service and a formal report made.

2.4 Evaluation

a. Availability

Complete engineering data and construction drawings were made available as well as past inspection reports.

b. Adequacy

The data made available was totally sufficient for a Phase I report in all respects.

c. Validity

The visual inspection of this facility showed no reason to question the validity of the information supplied.



Section 1.3 Continued

- (8) Cutoff----- 12' wide trench
- (9) Grout Curtain----- None
- (10) Other-----6" dia. seepage drain near toe

h. Spillway

- (1) Type----- Vegetated earth spillway
- (2) Length of Weir----- 260'
- (3) Crest Elevation----- 197.0
- (4) Gates----- None
- (5) U/S Channel----- Vegetated 2% slope
- (6) D/S Channel----- Vegetated 4% slope
- (7) General-----30' wide level section at crest

i. Regulating Outlets

Water level is controlled by the 48" diameter concrete pipe outletting from the concrete box drop inlet. The invert of this pipe is 157.5 at the drop inlet sloping to 154.0 at its outlet beyond the toe of the dam. The 48" pipe is ungated. The inlets into the intake box consist of a 36" diameter gated opening at invert 157.5 and two side wall weirs at elevation 163.0. Normal retained pool with the gate closed is at elevation 163.0.



Section 1.3 Continued

c. Elevation (ft. above MSL)

(1)	Top Dam-----	202.0
(2)	PMF Surcharge-----	200.5
(3)	Full Flood Control Pool-----	197.0
(4)	Spillway Crest ungated--	197.0
(5)	Upstream Portal Invert Diversion Tunnel-----	None
(6)	Streambed at Centerline of Dam-----	154±
(7)	Maximum Tailwater-----	Over elev. 180., could overtop railroad embankment due to 12.5' culvert

d. Reservoir

(1)	Length of Flood Control Pool-----	5400'±
(2)	Length of PMF Pool-----	5500'±

e. Storage (acre-feet)

(1)	Flood Control Pool-----	955
(2)	PMF Surcharge-----	1025
(3)	Top of Dam-----	1160

f. Reservoir Surface (acres)

(1)	Flood Control Pool-----	64±
(2)	PMF Pool-----	66±
(3)	Top of Dam-----	70±

g. Dam

(1)	Type-----	Gravity straight earth embankment
(2)	Length-----	642' not including spillway which is cut through existing ground
(3)	Height-----	60' including cutoff
(4)	Top Width-----	18'
(5)	Side Slopes-----	3½:1 U.S., 3:1 & 3½:1 D.S.
(6)	Zoning-----	3 Zones
(7)	Impervious Core-----	Class B-2, ML & SM soils



## Section 1.3

### 1.3 Pertinent Data

#### a. Drainage Area

A drainage area of 2,938 acres (4.59 s.m.) extends to the northwest of the dam. The main drainage course is the Powdermill Brook which has a length of 5.3 miles and a change in elevation of about 740 feet. The upper 2 miles of the drainage path has a change in elevation of about 550 feet. The remaining length of the brook has a "fairly regular" slope to the dam. The brook is intercepted by several roads and ponds which will influence flow.

About 75 percent of the drainage basin has rolling hills and "level" areas. There are numerous homes, buildings and roads. Most development is along Montgomery Road, which parallels Powdermill Brook.

Below the dam site there is extensive urban development, due to the City of Westfield.

#### b. Discharge at Dam Site

This structure has a reinforced concrete intake structure from which exits a 48" diameter concrete pipe at invert 157.5. There are two methods by which water flows into this structure. A 36" diameter inlet at invert 157.5 which is gated by a slide gate is one method by which water is allowed to enter. The other is over the two side walls which are constructed to form weirs at elevation 163.0. When the slide gate at the 36" diameter inlet is closed, a retained pool at elevation 163.0 is created and water flows over the weirs. The 48" diameter outlet is ungated.

The dam was constructed for detention of a 100 year frequency storm. The actual maximum detention since construction was completed was not determined. The vegetated spillway is ungated and has a capacity of 9492 cfs (2068 csm) at elevation 200.5.

The flood of record for Powdermill Brook occurred in August 1955, prior to dam construction, when the estimated peak flow of the Brook was 5,740 cfs for a drainage area of 2.5 square miles (2296 csm).



## Section 1.2 Continued

crest. Therefore it is classified as an intermediate size dam according to the recommended guide lines.

### d. Hazard Classification

Approximately 1000 feet downstream the outlet channel passes beneath a railroad embankment via a 12.5 foot culvert. If the dam should fail, and depending on the rapidity of failure, water could top this embankment or flow between the embankment and high ground immediately to the west. In either event, heavily populated areas exist within 1500 to 2000 feet of this point. Therefore the hazard classification according to the guidelines must be high. Based on the size and hazard classification, the PMF flood was adopted as the test flood for analyzing the relative adequacy of spillway capacity.

### e. Ownership

This dam is owned by the City of Westfield and has always been under their jurisdiction.

### f. Operation

The dam is maintained and operated by the "Flood Control Commission" located at 59 Court Street, City Hall, Westfield, Massachusetts. Mr. Gary Bulazo is chairman of the Flood Control Commission and may be contacted regarding operation of this dam (Tel. 413-568-7418).

### g. Purpose of Dam

The purpose of this dam is flood control. The area immediately below this location was severely damaged during the August 1955 flood. The dam was constructed to help alleviate the potential for this damage recurring.

### h. Design and Construction History

This dam was designed by the "Soil Conservation Service" of the U.S. Department of Agriculture in 1962. Construction was sponsored by the "Commonwealth of Massachusetts Water Resources Commission" also in 1962. There have been no major changes or repairs to this dam since its completion.



## Section 1.2 Continued

### b. Dam and Appurtenances

This dam is a 642 foot long, 60 foot high earth embankment dam. The upstream slope is built on a  $3\frac{1}{2}$ H:1V slope with a 38 foot wide berm at approximate midheight. The downstream slope begins on a 3H:1V slope down to a 40 foot wide berm at approximate midheight and then continues to the toe on a  $3\frac{1}{2}$ H:1V slope. The top width of the dam is 18 feet.

Just beyond the left abutment, easterly end of the dam, there is a 260 foot wide vegetated spillway cut through natural ground.

At the approximate center of the dam just beyond the upstream toe is located a concrete box drop inlet structure. This structure contains a 36 inch diameter inlet gated by a slide gate and a 48 inch diameter concrete pipe outlet. This outlet pipe extends through the dam discharging into a stilling basin just beyond the downstream toe. This pipe has reinforced concrete anti-seep collars spaced at 24 feet on centers placed around its perimeter for approximately  $\frac{3}{4}$  of its length beginning 26' from the upstream toe. When the 36" diameter inlet is closed, water enters the box by flowing over weirs formed by the remaining two sides of the box.

At a distance of 120 feet downstream of the centerline of the dam there is located a 6" diameter seepage drain. This drain parallels the centerline of the dam to where it is intercepted by the 48" outlet pipe. At this location, the drains run parallel to the outlet pipe and discharge into the stilling basin.

### c. Size Classification

This dam has a maximum hydraulic height of 49 feet and a storage capacity of 1160 a.f. with water to the dam's



PHASE I

NATIONAL DAM INSPECTION PROGRAM

POWDERMILL BROOK

SECTION 1

PROJECT INFORMATION

1.1 General

a. Authority

Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a national program of dam inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. Hayden, Harding & Buchanan, Inc. has been retained by the New England Division to inspect and report on selected dams in the State of Massachusetts. Authorization and notice to proceed was issued to Hayden, Harding & Buchanan, Inc. under a letter of May 3, 1978, from Mr. Ralph T. Garver, Colonel, Corps of Engineers. Contract No. DACW 33-78-C-0307 has been assigned by the Corps of Engineers for this work.

b. Purpose

(1) Perform technical inspection and evaluation of non-Federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by non-Federal interests.

(2) Encourage and assist the States to initiate quickly effective dam safety programs for non-Federal dams.

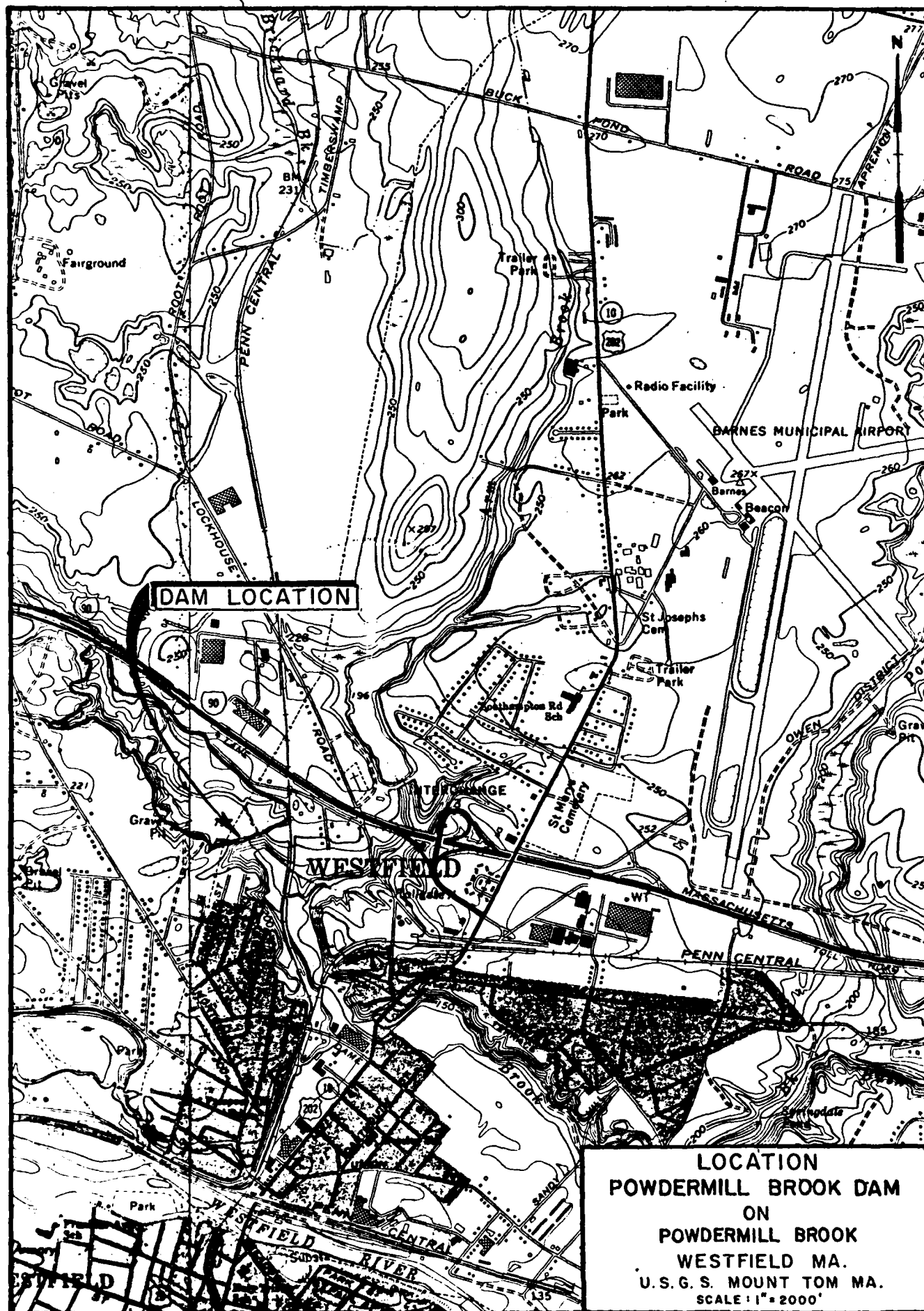
(3) To update, verify and complete the National Inventory of Dams.

1.2 Description of Project

a. Location

The Powdermill Brook Dam is located in the City of Westfield in Hampden County, Massachusetts, on Powdermill Brook, which is a tributary to the Westfield River.







SECTION 6  
STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations

The visual inspection did not disclose any apparent stability problems.

b. Design and Construction Data

Design drawings exist which indicate the dam is a zoned dam with a wide central core composed of silt and silty sand. The upstream and downstream shells are well graded sand to poorly graded silty sand. There is a cutoff trench beneath the axis of the dam. A seepage drainage system has been installed in the downstream section of the dam.

The upstream slope is 3.5H:1V with a berm at about midheight. The downstream slope is 3H:1V with a berm at about midheight.

c. Operating Records

No operating records were made available.

The dam has been inspected each year from 1966 to 1977 by the Soil Conservation Service. The dam was also inspected in 1974 by the Commonwealth of Massachusetts.

d. Post-construction Changes

There are no known post-construction changes to the embankment and appurtenant structures.

e. Seismic Stability

The dam is located in Seismic Zone 2 according to Corps of Engineers guidelines and it is assumed there is no earthquake hazard.



## SECTION 7

### ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

#### 7.1 Dam Assessment

##### a. Condition

The visual inspection did not disclose any findings that indicate an immediate unsafe condition, and the dam is in generally good condition.

##### b. Adequacy of Information

The information made available by the Soils Conservation Service was totally adequate for a Phase I level of investigation.

##### c. Urgency

Although the dam is in generally good condition with no immediate safety problems, the following recommendations and remedial measures are such that there is no reason why they should not be addressed within one year after receipt of this report. They are basically normal maintenance items which should be accomplished yearly.

##### d. Necessity of Additional Investigations

The findings of the visual inspection do not warrant additional investigation.

#### 7.2 Recommendations

As noted in Section 4.3 of this report there is some question as to the working ability of the draw down intake gate. The owner should insure the working of this gate and make any repairs as needed.

#### 7.3 Remedial Measures

Although this dam is in generally good condition, it is considered important that the following items be accomplished.

##### a. Alternatives

Not applicable to this report.

##### b. Operation and Maintenance Procedures

(1) Repair surface erosion channels at abutment/embankment contact and on the upstream and downstream faces.

(2) Install barriers to prevent vehicular traffic on the dam.

(3) The owner should develop a formal system for warning downstream residents in case of emergency.



APPENDIX A

VISUAL INSPECTION CHECK LIST



VISUAL INSPECTION CHECK LIST  
PARTY ORGANIZATION

PROJECT Powdermill Brook DATE May 31, 1978  
TIME 1:10 P.M.  
WEATHER Sunny 85°  
W.S. ELEV. 163.0 U.S. \_\_\_\_\_ DN.S. \_\_\_\_\_

PARTY:

1. Ron Cheney, H H & B 6. \_\_\_\_\_
2. Dan LaGatta, G E I 7. \_\_\_\_\_
3. Leonard Colson, Westfield part time 8. \_\_\_\_\_
4. Cecil Currin S C S (part-time) 9. \_\_\_\_\_
5. David Phillips, Westfield (p.t.) 10. \_\_\_\_\_

PROJECT FEATURE	INSPECTED BY	REMARKS
1. <u>Embankment Dam</u>	<u>D. P. LaGatta</u>	
2. <u>Intake Structure</u>	<u>Ron Cheney</u>	
3. <u>Spillway</u>	<u>D. P. LaGatta</u>	
4. _____		
5. _____		
6. _____		
7. _____		
8. _____		
9. _____		
10. _____		



# PERIODIC INSPECTION CHECK LIST

PROJECT Powdermill Brook DATE May 31, 1978  
 PROJECT FEATURE Embankment Dam NAME D. P. LaGatta  
 DISCIPLINE Geotechnical Engineer NAME R. Cheney  
Structural Engineer

AREA EVALUATED	CONDITIONS
<u>DAM EMBANKMENT</u>	
Crest Elevation	202.0
Current Pool Elevation	163.0
Maximum Impoundment to Date	Not Known
Surface Cracks	None observed
Pavement Condition	No Pavement
Movement or Settlement of Crest	None observed
Lateral Movement	None observed
Vertical Alignment	No misalignment observed
Horizontal Alignment	No misalignment observed
Condition at Abutment and at Concrete Structures	See text for discussion of erosion at left abutment
Indications of Movement of Structural Items on Slopes	None
Trespassing on Slopes	Motorbikes and 4-wheel drive vehicles have caused erosion
Sloughing or Erosion of Slopes or Abutments	See text for discussion of erosion at left abutment
Rock Slope Protection - Riprap Failures	No riprap
Unusual Movement or Cracking at or near Toes	None observed
Unusual Embankment or Downstream Seepage	None observed
Piping or Boils	None observed
Foundation Drainage Features	None observed
Toe Drains	None observed
Instrumentation System	None



## PERIODIC INSPECTION CHECK LIST

PROJECT Powdermill Brook

DATE May 31, 1978

PROJECT FEATURE Embankment

NAME B. P. LaGatta

DISCIPLINE Geotechnical Engineer  
Structural Engineer

NAME R. Cheney

AREA EVALUATED	CONDITIONS
<b>OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE</b>	
<b>a. Approach Channel</b>	This facility has no approach channel
Slope Conditions	
Bottom Conditions	
Rock Slides or Falls	
Log Boom	
Debris	
Condition of Concrete Lining	
Drains or Weep Holes	
<b>b. Intake Structure</b>	
Condition of Concrete	Good
Stop Logs and Slots	No stop log slots.



PROJECT Powdermill Brook DATE May 31, 1978  
 PROJECT FEATURE Embankment Dam NAME D. P. LaGatta  
 DISCIPLINE Geotechnical Engineer NAME R. Cheney  
Structural Engineer

AREA EVALUATED	CONDITIONS
<u>OUTLET WORKS - CONTROL TOWER</u>	Control tower and intake structure are one and the same.
a. Concrete and Structural	
General Condition	Good
Condition of Joints	Good
Spalling	None observed
Visible Reinforcing	None observed
Rusting or Staining of Concrete	None observed
Any Seepage or Efflorescence	None observed
Joint Alignment	Good
Unusual Seepage or Leaks in Gate Chamber	
Cracks	None observed
Rusting or Corrosion of Steel	None observed
b. Mechanical and Electrical	
Air Vents	One 36" circular slide gate on intake structure. Not able to check due to water surrounding structure.
Float Wells	
Crane Hoist	
Elevator	
Hydraulic System	
Service Gates	
Emergency Gates	
Lightning Protection System	
Emergency Power System	
Wiring and Lighting System in Gate Chamber	



PROJECT Powdermill BrookDATE May 31, 1978PROJECT FEATURE Embankment DamNAME D. P. LaGattaDISCIPLINE Geotechnical Engineer  
Structural EngineerNAME R. Cheney

## AREA EVALUATED

## CONDITIONS

## OUTLET WORKS - TRANSITION AND CONDUIT

General Condition of Concrete

Rust or Staining on Concrete

Spalling

Erosion or Cavitation

Cracking

Alignment of Monoliths

Alignment of Joints

Numbering of Monoliths

One outlet pipe. 48 inch dia. concrete  
pipe. Flowing freely.



# PERIODIC INSPECTION CHECK LIST

OBJECT Powdermill Brook DATE May 31, 1978  
 OBJECT FEATURE Embankment Dam NAME D. P. LaGatta  
 SCIENCE Geotechnical Engineer NAME R. Cheney  
Structural Engineer

AREA EVALUATED	CONDITIONS
<u>INLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL</u>	
General Condition of Concrete	No outlet structure. Pipe empties directly into a riprap stilling basin beyond toe of dam.
Rust or Staining	
Spalling	
Erosion or Cavitation	
Visible Reinforcing	
Any Seepage or Efflorescence	
Condition at Joints	
Drain Holes	None
Channel	Good Condition
Loose Rock or Trees Overhanging Channel	None of significance
Condition of Discharge Channel	Good



# PERIODIC INSPECTION CHECK LIST

SUBJECT Powdermill Brook DATE May 31, 1978  
 SUBJECT FEATURE Embankment Dam NAME D. P. LaGatta  
 DISCIPLINE Geotechnical Engineer NAME R. Cheney  
Structural Engineer

AREA EVALUATED	CONDITIONS
<u>LET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS</u>	
Approach Channel	
General Condition	Good
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	None
Floor of Approach Channel	Good
Weir and Training Walls	Vegitated Spillway with soil slope training walls
General Condition of Concrete	
Rust or Staining	
Spalling	
Any Visible Reinforcing	
Any Seepage or Efflorescence	
Drain Holes	
Discharge Channel	
General Condition	Good
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	None
Floor of Channel	Good
Other Obstructions	No obstructions



# PERIODIC INSPECTION CHECK LIST

AT Powdermill Brook  
 AT FEATURE Embankment Dam  
 PLINE Geotechnical Engineer  
 Structural Engineer

DATE May 31, 1978  
 NAME D. P. LaGatta  
 NAME R. Cheney

AREA EVALUATED	CONDITIONS
<u>AT WORKS - SERVICE BRIDGE</u> Super Structure Bearings Anchor Bolts Bridge Seat Longitudinal Members Under Side of Deck Secondary Bracing Deck Drainage System Railings Expansion Joints Paint Abutment and Piers General Condition of Concrete Alignment of Abutment Approach to Bridge Condition of Seat and Backwall	This facility has no service bridge.



## APPENDIX B

1. LIST OF DESIGN, CONSTRUCTION AND MAINTENANCE RECORDS
2. PAST INSPECTION REPORTS
3. PLANS AND DETAILS



LIST OF ENGINEERING DATA

Construction Drawings of Installation

Watershed Work Plan

Design Folder Covering Soils, Structural and Hydraulic  
Design

1 of the above mentioned information is located at:

U.S. Department of Agriculture  
Soils Conservation Service  
20 Cottage Street  
Amherst, Massachusetts 01002

Powdermill Brook



Powdermill Brook Watershed

Inspection Date 5/12/77

e/No. Powdermill site

Type Single Purpose Flood Retention

Inspection: Special ☐

Structure Operation:

Satisfactory ☒Annual ☒Unsatisfactory ☐

ng Local Organization: City of Westfield and Hampden Conservation District

for Inspection: Walter Ayers (Westfield Park Dept), John F. Sadowski and

ownlee (Westfield Flood Control Commission) Kenneth Healey (Hampden

District) William F. L. Arp (Soil Conservation Service)

1	Condi- tion * S or U	Maintenance & Needed Repairs	Esti- mated Costs	Agreed Dat. Repairs to be Complet.
etation	S	Topdress 300 Lb/Acre 10-10-10. Seed wear on lower beams by raking in 100 Lb line seed 10-10-10 27% 1 lb Burial seed 1/2 lb Crown etch 1/2 lb Red Fescue - all per 1000 sq. ft.	35/Ac.	By Sept 30 77
ces	---			
ncipal llway	U	Gate (now closed) is damaged and not functioning. 4 logs to be removed from trash rack	?	By Aug 1, 77
ergency llway	S	Keep woody vegetation at spillway entrance moved.		
ankment riprap	S			
ervoir ea	S	One rubber tire near rise to be removed		By Aug 1 77
tes or lves	U	See 3 above		
tlet annels	S			
ructure ainage tlets	S			
cess Rd.	U	All entrance divert surface water at top out of road. Place 2" max crushed stone 4" deep on short steep slope to top of dam.	100	By Aug 1, 77

S: (over)

S = Satisfactory; U = Unsatisfactory

ict Conservationist) (Project Engineer)

(SLO Representative)

t due, annually: July 1)



### Spillway

Problems: At the outlet end ground water seepage is weakening the toe of the bank and causing sloughing.

Corrective Measures: A subsurface (tile) drain installed across the slope back in the bank to intercept seepage and lead it to a protected outlet. The bank would then be regraded and seeded down using the same treatment and seed as specified for the dike.

### Structure

Problems: Mr. LaPlante pointed out the danger of people falling from the concrete headwall into the stilling basin.

Corrective Measures: 1. Steel posts leaded into holes drilled in the concrete headwall and wing walls with chain link fence installed.

### Canal

Condition of riser and principal spillway is good. The beach area is good and aside from need for erosion protection is in good condition. A small amount of debris is to be removed from the right and left upstream corners of permanent pool. Grass and legume cover other than those areas discussed above is in excellent condition although not fertilized this year. A maintenance program of fertilization should be carried on - 300 lb. 8-16-16 per acre annually.

### POWDERMILL SITE

Problems: Vehicular traffic is damaging the vegetation and causing erosion. A small gully is starting in the upstream west corner of the dike. Vegetation on the dike top, the downstream and upstream berms and below the upstream berm on the east end is very thin.

Corrective Measures: 1. Seed thin areas to Crownvetch and Tall Fescue or fertilize grass as outlined for Arm Brook.

2. Fence out traffic.

3. Stop and heal incipient gully by diverting water over onto adjacent well sodded waterway. Then fill in the gully with loam and seed to Crownvetch and Tall Fescue as above.



REPORT OF ANNUAL INSPECTION  
POWDERMILL BROOK WATERSHED  
WESTFIELD, MASS.  
1969

Inspection was performed May 23, 1969 with the following participants:

George H. McDonnell, County Engineer  
Thomas Doucette, WRC  
James Elasmr, SCS

Elemental inspection was performed July 8, 1969 by the following:

Roger LaPlante, Director, Parks and Recreation Department,  
City of Westfield  
William F. Warren, SCS

ARM BROOK SITE

Area

Problems: Gullies are being washed in the beach by runoff from the road and especially below the catch basin at the south end of the beach. In the latter case pine needle debris is clogging the catch basin grate. Erosion occurs below the outlet of the storm drain.

Corrective Measures: 1. A bituminous concrete curb along the beach side of the road the full length of the beach to lead road water to the catch basin.

2. Conversion of the catch basin to a drop inlet to eliminate the clogging grate.

3. Stone channel from storm drain outlet to the pond. Shape subgrade 2 feet below finish grade. Place 12" bank run gravel topped with 12" of riprap stone. Finished channel to be saucer shaped 6' wide on top and 12" deep in the middle.

4. A bituminous concrete paved waterway is needed in the incipient gully at the north end of the beach.

Problems: Grass on the top half of both sides and top of the dike and on the berm downstream is thin and weak. The soil is especially sandy and drouthy in these areas. Vehicular traffic is damaging the grass on the dike. (The lower slopes of the dike are in excellent trefoil and common vetch cover.)

Corrective Measures: 1. Fence the dam to exclude unauthorized vehicles.

2. Seed thin areas in September or early April to Crown-vetch. Rake in 100 lb. ground limestone and 12 lb. 8-16-16 fertilizer or equivalent per 1000 sq. ft. and seed 20 lb. Crownvetch and 20 lb. Tall Fescue per 1000 sq. ft.. A less desirable alternative would be to topdress to strengthen the existing grass with 10 lb. of 15-8-12 per 1000 sq. ft. three times a year (April 10, May 10, Sept. 10).



ual Inspection continued, May 12, 1970.

May 13, 1970

DERMILL DAM:

Conditions here are the same as last year. The following is a repetition of the report of last year.

This being a flood control dam normally has no pool. On the day the inspection there was a pool as a result of the gate being closed.

The joint at the upper end of the last pipe of the principal spillway needs to be cleaned and caulked.

All brush growth and small trees in the emergency spillway and on the side slopes should be cut.

Riprap at the outlet channel should be repaired and replaced where needed.

Two gullies at the right end of the dam on the upstream face, one at the top of the embankment and one near the lower berm, should be repaired to discourage further erosion.

A fence or a barricade should be erected to prevent vehicular traffic on the various sections of the dam and spillway.

Logs in pond at the riser and twigs inside the riser should be removed. Large logs lying on the ground in the pond area directly across from the principal spillway and to the west of the riser should all be removed and disposed of. If allowed to remain as they are they will be floated away in time of flood flow and may cause plugging of the riser.

Vegetative cover is very good in the emergency spillway (much of it Witch Grass) and better than last July on the dam. However, as last year, grass is poor on both berms, below the upstream berm and in some other individual areas. Soils in these places are particularly sandy and drouthy. Seed to Fescue-Crownvetch mixture same as outlined for Embrook. All areas to be mowed annually and topdressed with 300 to 500 lbs. 8-16-16 fertilizer.



MBROOK DAM - pg. 2

A considerable area of grass die-back was evident around the control section of the emergency spillway. This may be due to smothering of last years tall growth; if grass does not recover this summer, seed in early fall as above.

Barriers to vehicular traffic are still needed to keep such traffic off dike and emergency spillway.



REPORT OF ANNUAL INSPECTION

May 13, 1970

On May 12, 1970 the following met at the Armbrook Dam Site for the purpose of conducting the annual inspection of the Armbrook and Powdermill sites.

Nick Roselli	Conservation Commission
William Bennett	Flood Control Commission
Thomas Doucette	Water Resources Commission
Thomas Lewicke	Water Resources Commission
George McDonnell	Hampden County Hydraulic Engineer
William Warren	Soil Conservation Service
James Elasmarr	Soil Conservation Service

ARMBROOK DAM:

Outlet end of the Emergency Spillway is eroded. This condition is the same as it was a year ago. It is recommended to fill this area with a well graded material (stone fill) to within a foot of the top grade, topsoil and seed. This should stabilize the area from future erosion until a major storm occurs.

Area on left bank of the stream at the lower end of the berm ditch, was also eroded. This condition is also the same as last year. It is recommended that a drop inlet be built with a 12" pipe to carry the drainage to the stream.

The observation well downstream and to the right of the outlet structure has a solid iron cap on the top of the well pipe. This should be replaced with a heavy screen or the solid cap should be drilled.

Typical iron slime was noted in the bed of the stream just to the right of the observation well. Condition same as a year ago. Water has been tested and found not polluted.

In the beach area it was noted that water runs over the berm and spills over onto the beach causing rills. It was recommended that a drop inlet be built and the berm raised so that this water run-off will no longer top the berm.

Vegetative cover on the dam is in better condition than last July but this could be at least partly due to the season. The thinner areas should be seeded in early fall to a mixture containing Crownvetch, such as 1/2 lb. Tall Fescue, 1/2 lb. Red Fescue, 1/4 lb. Crownvetch per 1000 sq. ft. Rake in 100 lbs. ground limestone and 12 lbs. 8-16-16 fertilizer per 1000 sq. ft. before seeding. All grassed areas need fertilizing with 300-500 lbs. 8-16-16 per acre annually and annual mowing. Where the legumes are prevalent over areas of significant size, the fertilizer to be applied should be approximately 400 lbs. of 0-20-20 per acre.



for bikes continue to present a problem in wearing paths up and down the dike, across the emergency spillway and up the emergency spillway slopes.

#### treatment

Topdress with fertilizer this fall. On the dike use 400 lbs. per acre 8-16-16; on the emergency spillway and other grass areas use 400 lbs. per acre 10-10-10 or equivalent. Mow all areas.

#### WDERMILL DAM SITE

Conditions here are the same as last year with the exception that the joint at the upper end of the last pipe of the principal spillway has been cleaned and caulked. The following work should be done at this site:

1. Small trees in the emergency spillway and on the side slopes should be removed. The trees growing in the entrance to the emergency spillway present a very serious hazard in the event of a flood.
2. Riprap at the outlet channel should be repaired and replaced where needed.
3. Two gullies at the right end of the dam on the upstream face, one near the top of the embankment and one near the lower berm should be repaired to discourage further erosion.
4. A fence or a barricade should be erected to prevent vehicular traffic on the various sections of the dam and spillway.
5. Logs and rubber tires in pond at the riser and twigs inside the riser should be removed. If allowed to remain as they are they may cause plugging of the riser.
6. Vegetative cover is predominantly grass on all areas and is generally in excellent condition. Topdress this fall with 400 lbs. per acre 10-10-10 fertilizer or equal. Mow all areas.
7. Fill in three (3) wood chuck holes right of principal spillway, along outlet channel.
8. Dump should be pushed back from Flood Pool edges.

Submitted by W. Warren and J. Elasmay  
 William Warren                  James J. Elasmay  
 District Conserv.              Project Engineer

cc: C. Kennedy, WRC (3) (1 for DPW)  
 J. Elasmay  
 W. Warren (5)  
 D. Basinger  
 C. Moustakis  
 A. Verdi (2)  
 Engr. File



REPORT OF ANNUAL INSPECTION

POWDERMILL WATERSHED

May 24, 1971

June 17, 1971

ARMBROOK DAM SITE

May 21, 1971, the following met at the Armbrook Dam Site for the purpose of conducting the annual inspection of the Armbrook and Powdermill Sites:

Nick Roselli, Conservation Commission  
Kevin Maguire, Water Resources Commission  
L. T. Lee, D.N.R. - Forests and Parks  
Alfred Midura, Flood Control Commission  
William Warren, Soil Conservation Service  
James J. Elasmir, Soil Conservation Service

Outlet end of the Emergency Spillway is still eroded. It appears to be the same as it was a year ago. Recommendation is again made to fill area with a well graded drain material to within a foot of the top grade, topsoil and seed. Dead trees should be removed from this area.

Area on left bank of the stream at the lower end of the berm ditch was also eroded. This condition seems worse than it was a year ago. It is recommended that a drop inlet be built with a 12-inch pipe to carry the drainage to the stream.

Typical iron slime was noted in the bed of the stream just to the right of the observation well. Conditions same as a year ago.

Permanent pool looks fairly clean, however, large logs and two pieces of concrete pipe should be removed from the edge of the pool south of the riser.

Impact Basin is completely full of silt and should be cleaned out.

At the inlet of the emergency spillway the area was covered with water. It is recommended that approximately 300 feet of tile drain be installed with a metal pipe at the end emptying about 6-inches above the pool.

Barriers are still needed to keep traffic off dike and emergency spillway.

Vegetation Conditions

Vegetative cover over all has continued to improve and is in good to excellent condition. Some areas on the upstream face of the dam are still somewhat thin and weak. The downstream face of the dam has an excellent stand of birdsfoot trefoil mixed with grass while on the downstream face the trefoil is coming in quite well. On the emergency spillway and other sloped areas, grasses predominate.



Motor bikes continue to present a problem in wearing paths up and down the dike, across the emergency spillway and up the emergency spillway slopes.

Topdress with fertilizer this fall. On the dike use 400 lbs. per acre of 8-16-16; on the emergency spillway and other grass areas use 400 lbs. per acre 10-10-10 or equivalent. Mow all areas.

#### POWDERMILL DAM SITE

##### Structural Conditions and Recommendations

1. Small trees are growing in the emergency spillway and on the side slopes. They should be removed.
2. Riprap in the outlet channel is misplaced or missing. The area involved is about 6 feet x 10 feet on each side of the outlet of the principal spillway. This riprap should be repaired or replaced where needed.
3. A fence or a barricade should be erected to prevent vehicular traffic on the various sections of the dam and spillway.
4. Several large logs line the upstream shore of the dam and block the spillway opening. These must all be removed. Remove two logs at the low stage of the riser.
5. The sediment pool at the site is now full of sand.

##### Agronomic Conditions and Recommendations

1. Vegetative cover is predominantly grass on all areas and is generally in excellent condition. Topdress this fall with 400 lbs. per acre 10-10-10 fertilizer or equal. Mow all areas.
2. Barren sandy areas and the small gully at the right end of upstream face of the dam should be filled with loam and seeded down using 1 pound of Tall Fescue and 1/4 pound Redtop per 1000 square feet after mixing in 20 pounds of 10-10-10 fertilizer per 1000 square feet.

#### GENERAL

Locks and protective iron caps have been placed over the gate mechanisms at both dams to prevent unauthorized operation. So far this has worked well and the gate at Powdermill Dam is open as it should be.

Submitted by:

James J. Elasmr/ntl  
Project Engineer

and

William Warren  
District Conservationist

cc: C. Kennedy, WRC (3) (1 for DPW)  
J. Elasmr W. Warren (5)  
D. Basinger C. Moustakis  
A. Verdi (2) W. Annable  
C. Mills Engr. File



United States Department of Agriculture  
Soil Conservation Service  
29 Cottage Street  
Amherst, Massachusetts 01002

REPORT OF THE ANNUAL INSPECTION  
POWDERMILL WATERSHED

July 24, 1972

On May 12, 1972, the following met at the Arm Brook Dam Site to conduct the annual inspection of the two Powdermill Brook Watershed structures:

Alfred Midura, Westfield Flood Control Commission  
Lendrum L. Lee, DNR-Division of Forests and Parks  
Kenneth Healey, Hampden Conservation District  
Thomas Lewicke, Massachusetts Division of Water Resources  
Walter Ayers, Westfield Park Department  
William F. Warren, U.S. Soil Conservation Service

ARM BROOK DAM SITE

Structural Conditions and Recommendations

On this date, after heavy rains, water was going through the high stage of the principal spillway and the system was functioning properly.

Outlet end of the Emergency Spillway is still eroded. It appears to be the same as it was a year ago. Recommendation is again made to fill area with a well graded drain material to within a foot of the top grade, topsoil and seed. Dead trees should be removed from this area.

Area on left bank of the stream at the lower end of the berm ditch is also eroded. It is recommended that a drop inlet be installed with a 12-inch pipe to carry the drainage to the stream.

Impact Basin is full of silt and should be cleaned out.

Barriers are still needed to keep traffic off dike and emergency spillway.

A tire in the outlet channel should be removed.

The permanent pool appears to be in fairly clean condition.

Agronomic Conditions

Vegetative cover over all has continued to improve and is in good to excellent condition. Some areas on the upstream face of the dam are still somewhat thin and weak. The downstream face of the dam has an excellent stand of birdsfoot trefoil mixed with grass while on the upstream face the trefoil is coming in quite well. On the emergency spillway and other sloped areas, grasses predominate.



Powdermill SiteStructural Conditions and Recommendations

The pool area and the outlet channel contain excessive amounts of sediment. If the town would like the Soil Conservation Service's assistance in determining the exact source of the sediments and the effects upon the dam operation and the downstream area, a request should be submitted through the Hampden Conservation District, 4 Whalley Street, Hadley, Mass. 01035.

The following work should be done at this site:

1. Riprap that is missing in the outlet channel should be replaced.
2. Pool area and the outlet channel contain excessive sediments. It is recommended that these areas be studied to determine possible need for clean out or control of gate operation.
3. A fence or a barricade should be erected to prevent vehicular traffic on the various sections of the dam and spillway.
4. Remove logs and rubber tire from low stage of the riser.

Agronomic Conditions and Recommendations

Grass is thin with some small bare areas on the lower dike slopes and berm because of very poor sandy soil. The worst areas should be dug out six inches deep, repacked with loam and seeded. Work in 50 pounds limestone and 20 pounds 10-10-10 fertilizer per 1000 square feet before seeding one pound tall fescue and 1/8 pound redtop per 1000 square feet in September.

The upper slopes of the dike and the emergency spillway are in good grass cover. Topdress all areas annually with 300 pounds 10-10-10 per acre or equivalent and mow once a year. At least 25% of the Nitrogen should be derived from an organic source, ureaform or equivalent.

The trees in the emergency spillway noted in previous reports have been cut out. To prevent sprouting, the stumps or foliage should be treated with chemical brush killer.

cc: C. Kennedy, WRC (3)  
J. Elasmar  
D. Basinger  
A. Verdi (3)  
C. Mills  
W. Warren (7)  
C. Moustakis  
W. Annable  
Hampden Cons. District  
City of Westfield (2)



UNITED STATES DEPARTMENT OF AGRICULTURE  
Soil Conservation Service  
29 Cottage Street  
Amherst, Massachusetts 01002

June 20, 1973

REPORT OF ANNUAL INSPECTION  
POWDERMILL BROOK WATERSHED

On May 14, 1973, the following met at the Arm Brook Site of the Powdermill Brook Watershed in the City of Westfield, Massachusetts for the purpose of conducting the annual inspection of the Arm Brook Site and the Powdermill Site:

Walter Ayers, Director of Parks, City of Westfield  
Kevin Maguire, Water Resources Commission, Boston  
William Warren, Soil Conservation Service, Hadley  
James J. Elasmr, Soil Conservation Service, Otis

GENERAL

The City of Westfield is responsible for the operation and the maintenance of these sites.

ARM BROOK SITE

Structural Conditions and Recommendations

The outlet of the emergency spillway is eroded. It is recommended to fill this area with a well graded drain material to within a foot of the top grade, top-soil and seed. The area on the left bank of the stream at the lower end of the berm ditch is also eroded. It is recommended that a drop inlet be built with a 12-inch pipe to carry the drainage to the stream. The outlet channel is full of silt and should be cleaned out. The logs should be removed from the upstream toe of the dam. The concrete in the riser and the impact basin looks good.

If the town would like assistance from Soil Conservation Service on the design of the drop inlet described above, a request should be submitted through the Hampden Conservation District, 4 Whalley Street, Hadley, Mass. 01035.

Agronomic Conditions and Recommendations

Vegetative cover is generally good to excellent although it is thinner on the upper slopes of the dike than on the lower because of poorer soil. Wearing of paths by bikes is still a problem.

Topdress all areas annually with 300 pounds 10-10-10 or equivalent per acre and mow once a year. At least 25% of the Nitrogen should be derived from an organic source, ureaform or equivalent.

Pine tree seedlings have been set out up to the toe of the dike. Trees should not be planted or allowed to get started within thirty feet of the dike or in the channel and side slopes of the emergency spillway.



July 2, 1974

REPORT OF ANNUAL INSPECTION

POWDERMILL BROOK WATERSHED

On June 26, 1974, the following met at the Powdermill Brook Watershed in the City of Westfield, Massachusetts for the purpose of conducting the annual inspection of the Powdermill Site and the Arm Brook Site:

Walter Ayers	Director of Parks, City of Westfield
Alfred Meduri	Flood Control Commission, Westfield
Kevin Maguire	Water Resources Commission, Boston
Cecil B. Currin	Soil Conservation Service, Amherst
William Warren	Soil Conservation Service, Hadley
James J. Elasmur	Soil Conservation Service, Otis

POWDERMILL SITE

STRUCTURAL CONDITIONS AND RECOMMENDATIONS

The outlet channel contains sediment that should be removed. A 12" corrugated drain, left of the outlet and 75 feet away, should be cleaned. Riprap should be replaced in the outlet channel. Logs and other debris should be removed from the riser area. Site looks much better than it did a year ago.

AGRONOMIC CONDITIONS AND RECOMMENDATIONS

Report will be submitted by William Warren

ARM BROOK SITE

STRUCTURAL CONDITIONS AND RECOMMENDATIONS

Logs and other debris should be removed from the riser area and from the edges of the permanent pool. Sediment in the outlet channel and in the impact basin should be removed. Remove three wood planks from the impact basin. Eroded areas on left bank of the stream at the lower end of the berm ditch should be rebuilt. Install 200 feet of 4" drain perforated pipe from the catch basin along the toe of slope of the left bank of the stream to drain area.

AGRONOMIC CONDITIONS AND RECOMMENDATIONS

Report will be submitted by William Warren

Submitted by:

*JJE*  
James J. Elasmur  
District Engineer



May 9, 1975

REPORT OF ANNUAL INSPECTION

POWDERMILL BROOK WATERSHED

On May 8, 1975, the following met at the Powdermill Brook Watershed in the City of Westfield, Massachusetts, for the purpose of conducting the annual inspection of the Powdermill Site and the Armbrook Site:

Alfred Neduri	Flood Control Commission - Westfield
Valter Ayers	Director of Parks - Westfield
Beverly Storey	Flood Control Commission - Westfield
Allen Brownlee	Flood Control Commission - Westfield
Michael Lorenzatti	Flood Control Commission - Westfield
Kevin Maguire	Water Resources Commission - Boston
William Warren	Soil Conservation Service - Hadley
James Elasmay	Soil Conservation Service - Otis

Powdermill Site

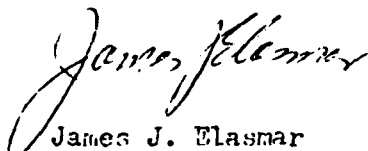
1. Remove logs and debris from entrance of emergency spillway.
2. Clean branches and other debris from trash rack of riser.
3. Remove shrubs and foreign growth from lip of emergency spillway.
4. Fill in three animal holes in emergency spillway.

The site looks very good.

Armbrook Site

1. Remove logs from edge of permanent pool.
2. Eroded area on left bank of stream at lower end of berm ditch should be repaired.
3. Repair eroded areas of berm.
4. Replace Manhole cover.
5. Remove logs and debris from Impact Basin.
6. Fill area at end of spillway.

Agronomic Conditions and Recommendation for the above sites will be submitted by William Warren.



James J. Elasmay  
Project Engineer  
Otis, Mass.



Ernest Struzziero/Water-Resources.com

REMARKS: (over) \* S = Satisfactory; U = Unsatisfactory

Bill D. Moore Cecil B. Curran Beverly Story  
(District Conservationist) (Project Engineer) (SLO Representative)  
(Report due, annually: July 1)



### Emergency Spillway

Problems: Small trees and large brush are growing up at the entrance to the emergency spillway constituting a potentially serious threat to its ability to accept heavy flows.

Corrective Measures: All woody vegetation to be cut away from the emergency spillway entrance. Drench freshly cut stumps with brush killer cut with kerosene to prevent sprouting.

### Principal Spillway

Problems: Joint caulking at upper end of last pipe has fallen out exposing it to ice and frost action which could eventually pry this section loose causing major damage. Stone riprap on the right bank of the outlet channel is missing exposing the bank to erosion.

Corrective Measures: 1. Repair pipe joint with bituminous compound.  
2. Repair riprap with angular riprap stone placed a minimum of 12" in thickness or dumped in 18" thick. Stone size 12" in least dimension.

### Pool Area


Problems: Car body in upper end of pool area. Pool is being flooded by unauthorized closing of the gate with attendant frequent complaints from abutters.

Corrective Measures: 1. Remove car body.  
2. Use what methods are necessary to keep drain gate open.

### General

Trefoil and grass cover is good on the emergency spillway and other areas not mentioned above. Maintenance topdressing with 300 lbs. per acre 8-16-16 or equivalent and annual mowing should be carried on. The dike above the upstream berm should receive 500 lbs. per acre annually. Logs in the pool area left of the riser should be removed.

This is to acknowledge receipt by the Mayor's office of this report.

 8-26-69  
John J. Palczynski, Mayor



Report of Annual Inspection  
PL-566 Structures

May 23, 1969

Date

Site Armbrook Town Westfield Watershed Powdermill

Participants in Inspection:

George H. McDonnell County Engineer

Thomas Doucette WRC

James Elasmr SCS

- A. Vegetative Evaluation: Embankment slopes, top & gutters and emergency spillway; need for fertilizing, lime, re-seeding, mowing, erosion control, etc.

Crown vetch much better than last year. Grass cover good, however there are small areas that need lime and fertilizer.

- B. Principal spillway & appurtenances: Stability, condition of concrete & steel, water tightness of gate, rip-rap at outlet, etc.

Condition of riser and principal spillway in good condition.

- C. Permanent Pool: Water quality, debris, undesirable vegetation, etc.

Small amount of debris to be removed from right and left upstream corners of permanent pool.

- D. Facilities & Miscellaneous: Beach, boat ramp, bath house, access road, fences, signs, barricades, etc.

Beach clean and in good condition.

WESTFIELD

Sponsor responsible for Operation and Maintenance

By James Elasmr



Report of Annual Inspection  
PL-566 Structures

May 23, 1969

Date

Site Powdermill Town Westfield Watershed Powdermill

Participants in Inspection:

George H. McDonnell County Engineer

Thomas Doucette WRC

James Elasmur SCS

- A. Vegetative Evaluation: Embankment slopes, top & gutters and emergency spillway; need for fertilizing, lime, re-seeding, mowing, erosion control, etc.

Mowings are producing some matting, but in general protection is good. Fertilize and lime needed in top of dam and upstream toe of dam. Gully, right corner of upstream slopes same as last year.

- B. Principal spillway & appurtenances: Stability, condition of concrete & steel, water tightness of gate, rip-rap at outlet, etc.

Joint upper end of last pipe needs to be cleaned and caulked. Brush in Emergency spillway should be cut. Riprap at outlet channel should be repaired. Fence should be erected to prevent traffic from top of dam and from upstream toe of dam.

- C. Permanent Pool: Water quality, debris, undesirable vegetation, etc.

Logs in pool area left of riser should be removed. Pool area should be drained.

- D. Facilities & Miscellaneous: Beach, boat ramp, bath house, access road, fences, signs, barricades, etc.

WESTFIELD  
Sponsor responsible for Operation and Maintenance

By

James J. Elasmur



Annual Inspection - Powdermill Brook Watershed,  
April 30, 1968

On April 30, the following people met at the Arm Brook site, Powdermill Brook Watershed, for the purpose of conducting an annual inspection of both the Arm Brook and Powdermill Brook sites: Roger Leplante, Westfield Parks and Recreation Department; George Hartley and Nicholas Rozelli, Hampden Conservation District; George McDonnell, Hampden County Engineer; Tom Doucette, Massachusetts Water Resources Commission; Charles Conlin, Christopher Moustakis, Karl Klingelhofer, and James Elasmr, Soil Conservation Service.

Mr. Leplante could only be present for the Arm Brook inspection.

Arm Brook site

The entire area was walked by the inspection team and an overall general improvement of the area was noted over that observed the previous year. There are a number of items still needing attention which are itemized below.

1. The entire vegetated area needs to be limed and fertilized according to soil tests, as soon as possible, even though fertilizer was applied last fall. It was reported by Mr. Leplante that a contract was being entered into with Agway to apply fertilizer, in the near future, according to soil test.
2. There are a number of small areas where some filling and re-seeding will be required.
  - a. Wheel tracks across top of dam - wait until next year to re-evaluate need.
  - b. Gutters - left side of dam looking downstream on both the upstream and downstream slopes - sodding after filling is recommended rather than seeding.
  - c. Left bank of inlet portion of emergency spillway.
  - d. Gully on beach area - fill only, no seeding required.
3. A barricade is definitely needed to stop traffic along the woods above the emergency spillway.
4. Pick up and dispose of floating debris around edges of permanent pool.



5. Asphalt curb should be raised around catch basin at beach to prevent overtopping. It is also recommended that a different type of grating be installed which will not plug so easily. A diversion channel should extend each way from the catch basin to better collect runoff in this area and lead it to the catch basin.
6. Relief Well No. 2 (right side looking downstream) - all gravel should be cleaned out of the well casing, as soon as possible.
7. The well extending up out of the relief trench below the outlet structure should likewise be cleaned out.
8. Caps should be added to relief wells #1 and 2 and the relief trench well. The relief trench well cap should have a screened top to permit easy observation.
9. A new plaque should be installed to replace the one stolen.
10. A pipe outlet structure should be installed at the outlet of the diversion which runs along the left abutment (looking downstream).
11. Riprap on the slopes immediately below the outlet structure should be picked up and replaced.
12. An iron deposit was noted on the right downstream corner of the relief trench. This should be watched on future visits to the site.
13. An evaluation should be made in July as to the need for mowing.

Mr. Leplante stated that items 1, 2b, 3, 6, 7 and 8 would be taken care of by Memorial Day, if at all possible.

#### Powdermill Brook site

The inspection party walked the entire site and again noted some improvement of the vegetative stand over that observed during last years' inspection. Even though the area was fertilized last fall, further general improvement of the turf is necessary. Items needing attention are listed below:

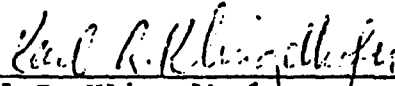
1. Lime and fertilizer should be applied to the entire area according to soil test. It was understood that this site is to be fertilized in the very near future according to soil test, as noted under the Arm Brook site.



2. Any bare areas should be re-seeded.
3. A gully has developed in the left downstream gutter which should be filled with coarse gravel or as an alternative loam and seeded.
4. The joint between the first and second sections of pipe at the outlet of the principal spillway should be filled with an asphalt compound.
5. Trash around the inlet to the principal spillway should be removed and disposed of.
6. All logs lying around the edge of the flood pool should be stockpiled and burned or buried or other wise disposed of. This includes all logs and other debris to an elevation 10 feet above the permanent pool.
7. The entrance to the pipe culvert at the inlet of the emergency spillway (left side looking downstream) should be cleaned out.
8. All brush (mostly wild cherry) at the entrance of the emergency spillway should be cut and stumps treated or entire trees and shrubs sprayed with a foliage herbicide.
9. A fence and barricade is seriously needed to prevent vehicle entrance to the dam site area along the right abutment looking downstream (powerline side).
10. An evaluation should be made in July as to the need for mowing.

According to the Operation and Maintenance Agreement the Sponsoring Local Organization is responsible for preparing the Annual Inspection Report and distributing copies to the interested parties. It is requested that this provision be put into effect for all future inspections.

It is also requested that the Sponsoring Local Organization provide the Soil Conservation Service with a report on all maintenance costs on an annual basis as provided for in the Operation and Maintenance Agreement.

  
Karl R. Klingelhofer  
State Conservation Engineer/ntl

cc: Water Resources Commission  
Leplante  
Mayor of Westfield  
County Engineer  
Conlin  
Elasmar  
K. Klingelhofer  
W. S. Unit File



UNITED STATES DEPARTMENT OF AGRICULTURE  
Soil Conservation Service  
29 Cottage Street  
Amherst, Massachusetts 01002

ANNUAL INSPECTION  
POWDERMILL BROOK WATERSHED  
May 29, 1967

On May 24, 1967, the following people met at the Arm Brook site, Powdermill Brook Watershed, for the purpose of conducting an annual inspection of both the Arm Brook and Powdermill Brook sites: Tom Doucette, Water Resources Commission, Massachusetts; Hans vanLeer, Division of Conservation Services, Massachusetts; Lewis Allesio, Parks and Recreation Department, Westfield; Edward Barry, Superintendent of the Department of Public Works, Westfield; George Horosco, Foreman, Department of Public Works, Westfield; Charles Conlin, Charles Holden, Christopher Moustakis, Karl Klingelhofer, Soil Conservation Service.

Representatives of the City of Westfield were not present for the entire inspection.

Arm Brook Site

During the past year, the principal spillway was extended, an impact basin added, and a drainage berm and deep relief trench installed to correct the foundation problem which existed at this site. This work appears to have successfully corrected the problem that existed and full use can now be made of this site.

There has been practically no maintenance of the vegetative cover at this site since it was constructed and it is deteriorating. The inspection pointed out the following maintenance needs as follows:

1. Lime and fertilizer should be based on current soil tests. In lieu of soil tests, the entire vegetated area should be fertilized with 75 pounds per acre of nitrogen, 50 pounds of  $P_2O_5$ , and 50 pounds of  $K_2O$  annually and 2 tons per acre of lime every 2 or 3 years.
2. Mowing is not now needed, but an evaluation for this need should be made by the local Soil Conservation Service technician during the summer and a report prepared by August 18.
3. All unauthorized vehicular traffic should be excluded from the dam site and emergency spillway areas. This will require the installation of gates and barriers.
4. Debris along the entrance to the emergency spillway should be removed.
5. There is a small gully which has developed on the edge of the berm along the left side of the entrance section of the emergency spillway. This should be filled with well-graded gravel ranging in size from three inches to medium sand. Bare areas on the slopes of the emergency spillway should be over-seeded.



6. The outlet for the diversion along the left abutment on the downstream side of the dam should be partially filled with well-graded gravel plus a top layer of coarse rock (three to six inches in size). This area should not be completely filled, leaving a depressed section to confine the flowing water.
7. The left gutter on the downstream side of the dam now covered with jute netting should be over-seeded.
8. The access road needs to be re-graded for improved surface drainage.
9. The gully in the beach area should be filled. It is recommended that a catch basin type drain be installed before filling to prevent future overflow in this area.

Mr. Allesio explained that the Parks and Recreation Department had been assigned the responsibility for maintenance of this site, and explained their plans for performing the needed work. The Westfield Department of Public Works has agreed to assist the Parks and Recreation Department in this work.

#### Powdermill Brook Site

Maintenance needs are as follows:

1. The entire vegetated area needs fertilizing and possibly liming as outlined in item #1 pertaining to the Arm Brook site.
2. Mowing will probably be needed during the late summer or early fall and an evaluation of this need should be made by the local Soil Conservation Service technician of this need during the summer and a report prepared by August 18.
3. Vehicular traffic is causing serious damage to the berm and slopes of the embankment. All unauthorized vehicles should be excluded by the construction of suitable barriers.
4. The left gutter on the upstream slope of the dam has been seriously damaged by traffic. It now needs to be fertilized and reseeded. At the base of this gutter, two gullies have developed which should be filled with well-graded gravel ranging in size from three-inch to medium-size sand. Sufficient gravel may be available at the base of these gullies.
5. Debris has collected in the trash rack of the principal spillway riser that should be cleaned out. There is also some debris around the edges of the sediment pool and at the outlet of the principal spillway that should be disposed of.
6. Willow shoots in the entrance and exit sections of the emergency spillway should be kept mowed or sprayed to prevent their development into trees.



7. The outlets to the toe drainage system (small diameter corrugated pipe) at the outlet of the principal spillway should be cleaned out to make sure they are free draining.
8. The sedimentation problem which has developed at the city sanitary land fill area should be controlled by the installation of desilting basins.

*K. R. Klingelhofer*  
Karl R. Klingelhofer/mgc  
State Conservation Engineer

cc: George McDonnell, County Engineer  
George Hartley, Chairman, Hampden Cons. District  
Malcolm Graf, Water Resources Commission  
Don Weinle, Westfield, City Engineer  
Harold J. Martin, Mayor of Westfield  
Charles Conlin, LUC, West Springfield  
Lewis Allessio, Parks & Recreation Dept., City Hall, Westfield  
K. Klingelhofer  
Otis Project Office  
C. Moustakis  
Dr. Isgur, C.O. Brown  
W.S. file



POWDERMILL BROOK WATERSHED ANNUAL INSPECTION

by

June 9, 1966

Karl R. Klingelhofer  
State Conservation Engineer  
Soil Conservation Service  
29 Cottage Street  
Amherst, Mass. 01002

On June 9, 1966, the following people met at the Arm Brook site, Powdermill Brook Watershed, for the purpose of conducting an annual inspection of both the Arm Brook and Powdermill Brook sites:

Donald Kirby, Water Resources Commission, Massachusetts  
George Hartley, Chairman, Hampden Conservation District  
Nicholas Roselli, Hampden Conservation District  
George McDonnell, Hampden County Engineer  
Karl R. Klingelhofer, Soil Conservation Service

The City of Westfield was notified of this inspection, but did not send a representative.

ARM BROOK SITE

During the past year two relief wells were installed and the riprap reconstructed under contract to alleviate a foundation condition which exists at this dam site. The work performed did not solve the problem and additional work is planned. Within the next two months a new contract is expected to be awarded for the extension of the principal spillway conduit by 48 feet, the addition of an impact basin at the outlet of this conduit, the construction of a filter berm to an elevation that will cover the conduit extension and the installation of a deep relief trench extending to the aquifer that exists at approximately a 25-foot depth. It is anticipated that this work will solve the problem which has existed at this site -- the work to be completed by winter of 1966.

There has been practically no maintenance of the vegetative cover which exists at this site and it is rapidly deteriorating. Fertilization is desperately needed. Sixty pounds per acre of nitrogen, sixty pounds of  $F_2O_5$ , and sixty pounds of  $K_2O$  should be applied. About 50 per cent of the nitrogen should be in the inorganic form.

The dam and emergency spillway should be mowed during the summer months.

There are two gullies in the beach area which should be repaired. Recommendations for the repair of these gullies can be obtained from the Soil Conservation Service.

It is quite possible that this site should be re-limed. Suggest that the local County Agent or an SCS technician be asked to check the PH and recommend a liming rate.



The tile drain outlet which is located along the shore line at the  
 et to the emergency spillway is apparently covered over. This should  
 located and uncovered.

There is an abundance of litter in the woods along the access road  
 ch should be cleaned up.

DERMILL BROOK SITE

For the Powdermill Brook site, the same comments and recommenda-  
 ns regarding lime, fertilizer and mowing as were made for the Arm  
 ok site, apply. Here again the vegetation is in desperate need of  
 per care.

The manhole cover for the riser has been removed. This should be  
 laced.

There is a log near the riser that should be removed and disposed of.

The stand of vegetation that exists on both of these sites is  
 equate. With proper care and maintenance, a dense turf would develop.  
 s turf is especially important and is needed in the emergency spill-  
 s. Sufficient funds and the means for doing this work were to have  
 an established according to the Operations and Maintenance Agreement  
 at was signed by the City of Westfield.

*Karl R. Klingelhofer*  
 Karl R. Klingelhofer, State Cons. Engr./wmb

: George McDonnell, County Engr.,  
 Tighe & Bond, 211 Bowers and Pequot Sts.,  
 Holyoke, Mass. 01040  
 George Hartley, Chairman, Hampden Cons. District  
 Malcolm Graf, Director, Water Resources Commission  
 Don Weinle, Westfield City Engineer  
 Harold J. Martin, Mayor of Westfield  
 Conlin, WUC, West Springfield  
 Klingelhofer  
 R. Brown  
 W.S. file



# INSPECTION REPORT - DAMS AND RESERVOIRS

## CATION:

ty/Town Westfield . County Hampden . Dam No. 2-7-329-15

me of Dam Powder Mill Brook Dam .

Mass. Rect.

po Sheet No. 12A . Coordinates: N 420,000 , E 260,700 .

inspected by: Harold T. Shumway , On Jan. 15, 1974 . Date 1970 Last Inspection

INNER/S: As of January 15, 1974

er: Assessors \_\_\_\_\_, Reg. of Deeds \_\_\_\_\_, Prev. Insp. \_\_\_\_\_, Per. Contact X

. City of Westfield, Municipal Conservation Commission, Municipal Building.

Name	St. & No.	City/Town	State	Tel. No.
Westfield, Massachusetts				

Name	St. & No.	City/Town	State	Tel. No.

Name	St. & No.	City/Town	State	Tel. No.

ARETAKER: (if any) e.g. superintendent, plant manager, appointed by  
absentee owner, appointed by multi owners.

Same as above.

Name	St. & No.	City/Town	State	Tel. No.

## ATA:

No. of Pictures Taken None . Sketches See description of Dam.

Plans, Where January, 1962 construction plans U.S.S.C.S plan No. M.A.-412-1

Copy in possession of Conservation Commission.

DEGREE OF HAZARD: (if dam should fail completely)\*

- |                    |                                 |
|--------------------|---------------------------------|
| 1. Minor _____.    | 3. Severe _____.                |
| 2. Moderate _____. | * 4. Disastrous <u>X</u> _____. |

Comments: \* Assuming dam was at flood capacity at time of failure.

This rating may change as land use changes (future development).



LET CONTROLS AND DRAWDOWN

Approximate center of dam - 6' - 6" H. x 12' L. x 4' W.  
ation and Type: concrete drop box inlet with a 48" diameter conduit  
outlet.

controls N/A, TYPE: \_\_\_\_\_.

omatic \_\_\_\_\_, Manual \_\_\_\_\_, Operative Yes \_\_\_\_\_, No \_\_\_\_\_.

ments: 2 - each openings - 12' wide by 1.0' H. at top of drop box inlet.

ation and Type: At bottom of drop - inlet - 36" diameter slide gate sluice.

controls Yes, Type: 36" diameter - Model 20-10C ARICO slide gate or its equal

omatic \_\_\_\_\_, Manual X, Operative Yes X, No \_\_\_\_\_.

ments: Gate covered with debris at time of inspection

ation and Type: Easterly end of dam - swale spillway - 260' W. on  
bottom x 5' H.

controls N/A, Type: \_\_\_\_\_.

omatic \_\_\_\_\_, Manual \_\_\_\_\_, Operative Yes \_\_\_\_\_, No \_\_\_\_\_.

ments: \_\_\_\_\_.

present Yes X, No \_\_\_\_\_, Operative Yes X, No \_\_\_\_\_.

: See Item #2 above

AM FACE: Slope 3 $\frac{1}{2}$ :1, Depth Water at Dam 3 $\frac{1}{2}$ '.

: Turf X, Brush & Trees \_\_\_\_\_, Rock fill \_\_\_\_\_, Masonry \_\_\_\_\_, Wood \_\_\_\_\_.

n: 1. Good X, 3. Major Repairs \_\_\_\_\_.

2. Minor Repairs \_\_\_\_\_, 4. Urgent Repairs \_\_\_\_\_.

: Slope appeared well turfed and stable.

REAM FACE: Slope 3:1 and 3 $\frac{1}{2}$ :1.

: Turf X, Brush & Trees \_\_\_\_\_, Rock Fill \_\_\_\_\_, Masonry \_\_\_\_\_, Wood \_\_\_\_\_.

n: 1. Good X, 3. Major Repairs \_\_\_\_\_.

2. Minor Repairs \_\_\_\_\_, 4. Urgent Repairs \_\_\_\_\_.

: Appeared well turfed and stable.



- 3 -

SPILLWAY: Available Yes. Needed \_\_\_\_\_.Above Normal Water 34 Ft.260' on \_\_\_\_\_ Ft. Height 5 Ft. Material Earthen with 3:1 side slope  
bottom \_\_\_\_\_on: 1. Good X. 3. Major Repairs \_\_\_\_\_.  
2. Minor Repairs \_\_\_\_\_. 4. Urgent Repairs \_\_\_\_\_.ts: Bottom and slopes of emergency spillway appeared very stable.  
\_\_\_\_\_  
\_\_\_\_\_VEL AT TIME OF INSPECTION: 40 $\frac{1}{2}$  Ft. Above \_\_\_\_\_. Below X.m X F.L. Principal Spillway \_\_\_\_\_  
\_\_\_\_\_Freeboard 39 Ft.  
\_\_\_\_\_

## OF DEFICIENCIES NOTED:

1 (Trees and Brush) on Embankment None Found1 Burrows and Washouts None Founde to Slopes or Top of Dam None Evidented or Damaged Masonry Nonence of Seepage None Evidentnce of Piping None FoundNone Foundon None Evidentand/or Debris Impeding Flow Considerable debris around inlet to drop boxed or Blocked Spillway Some driftwood noted on top of drop box inlet opening.  
\_\_\_\_\_





TO NO. 5 - General view of normal impoundment and intake structure



TO NO. 6 - General view of outlet channel





PHOTO NO. 3 - Downstream slope showing erosion due to trespassing on slope



PHOTO NO. 4 - Upstream slope showing erosion of left abutment area



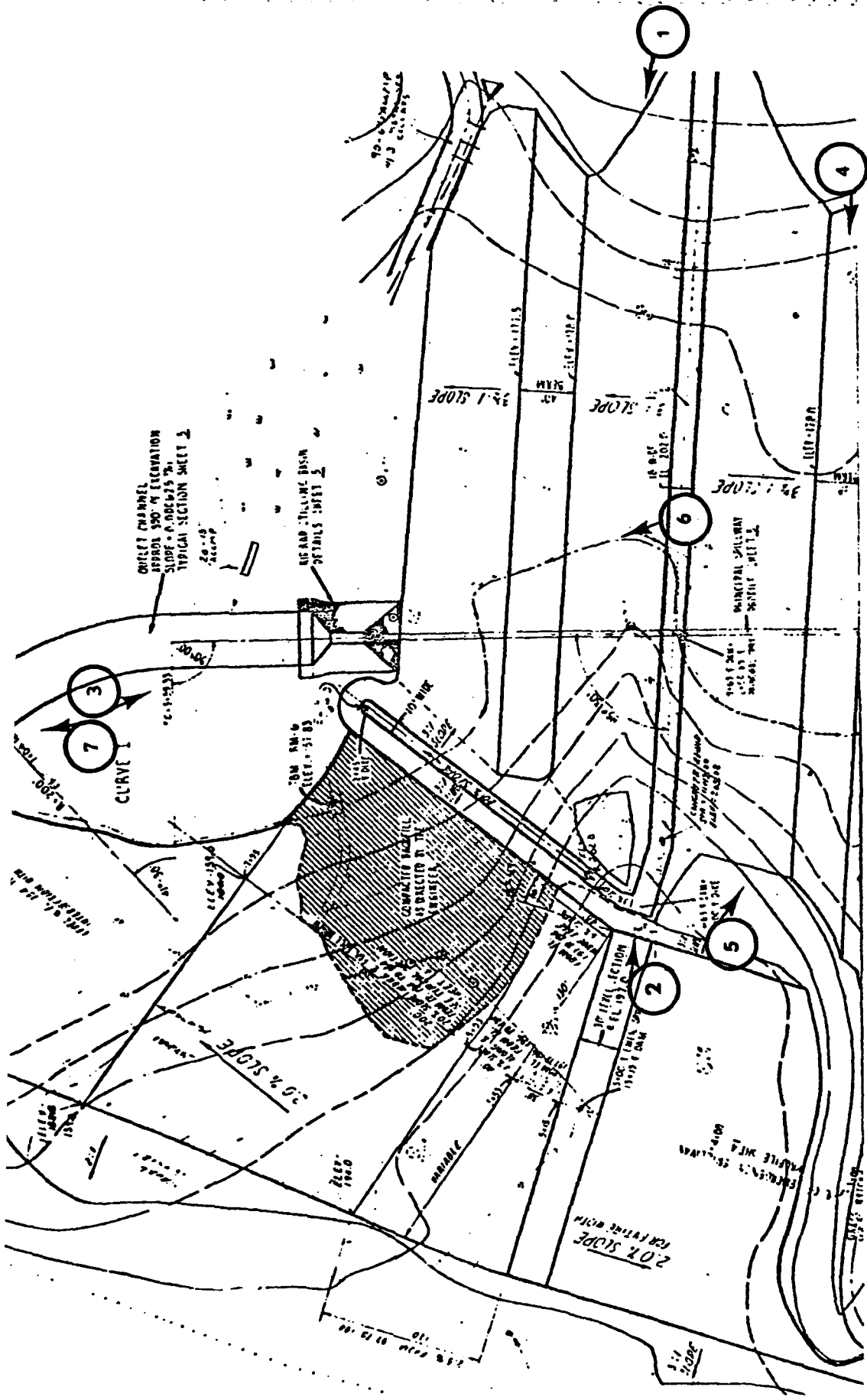


PHOTO NO. 1 - Downstream slope from right abutment



PHOTO NO. 2 - Erosion on end slope from dam crest to spillway floor





# LOCATION OF PHOTOGRAPHS

## POWDERMILL BROOK DAM

WESTFIELD MA.

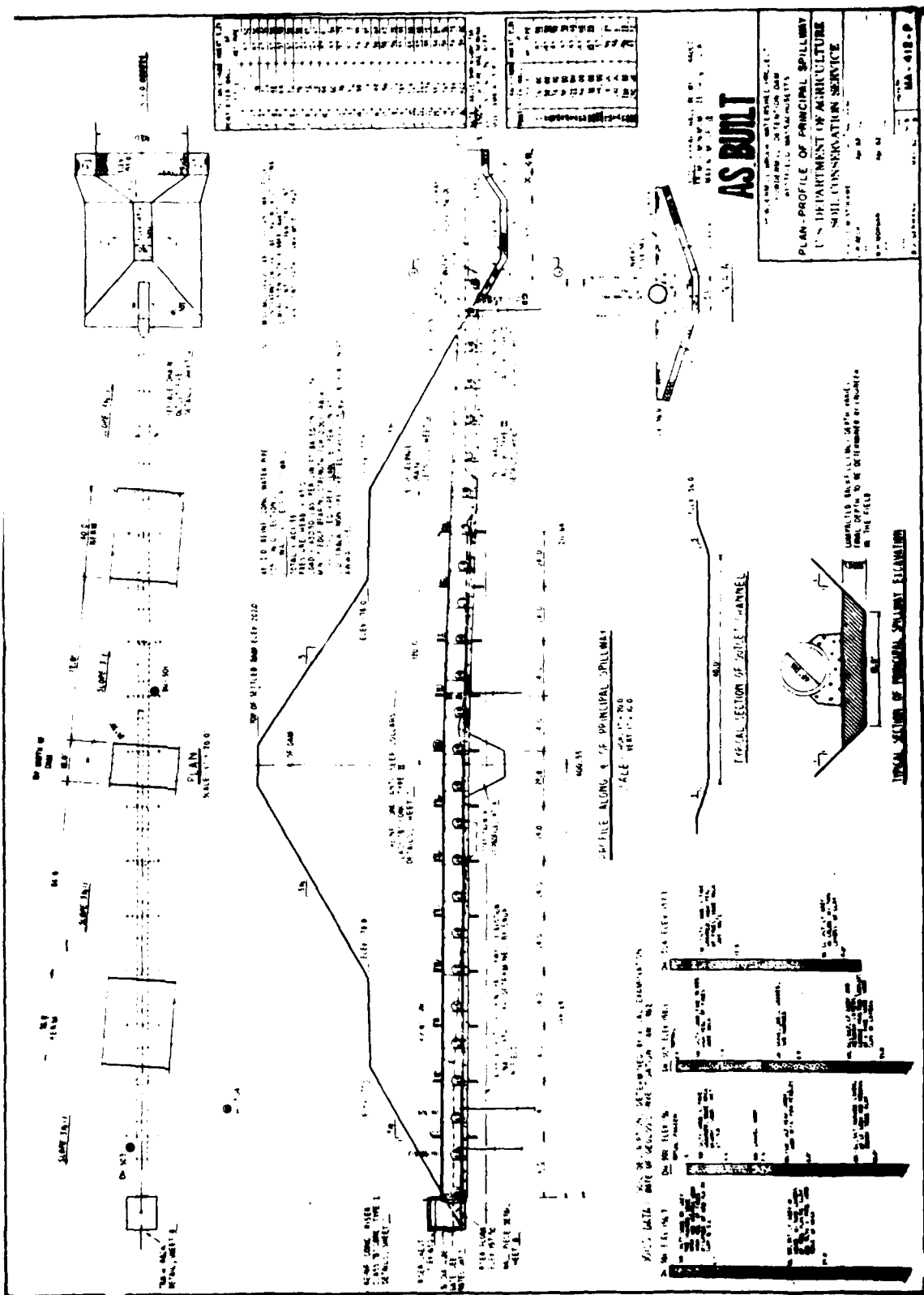
AUG. 1978



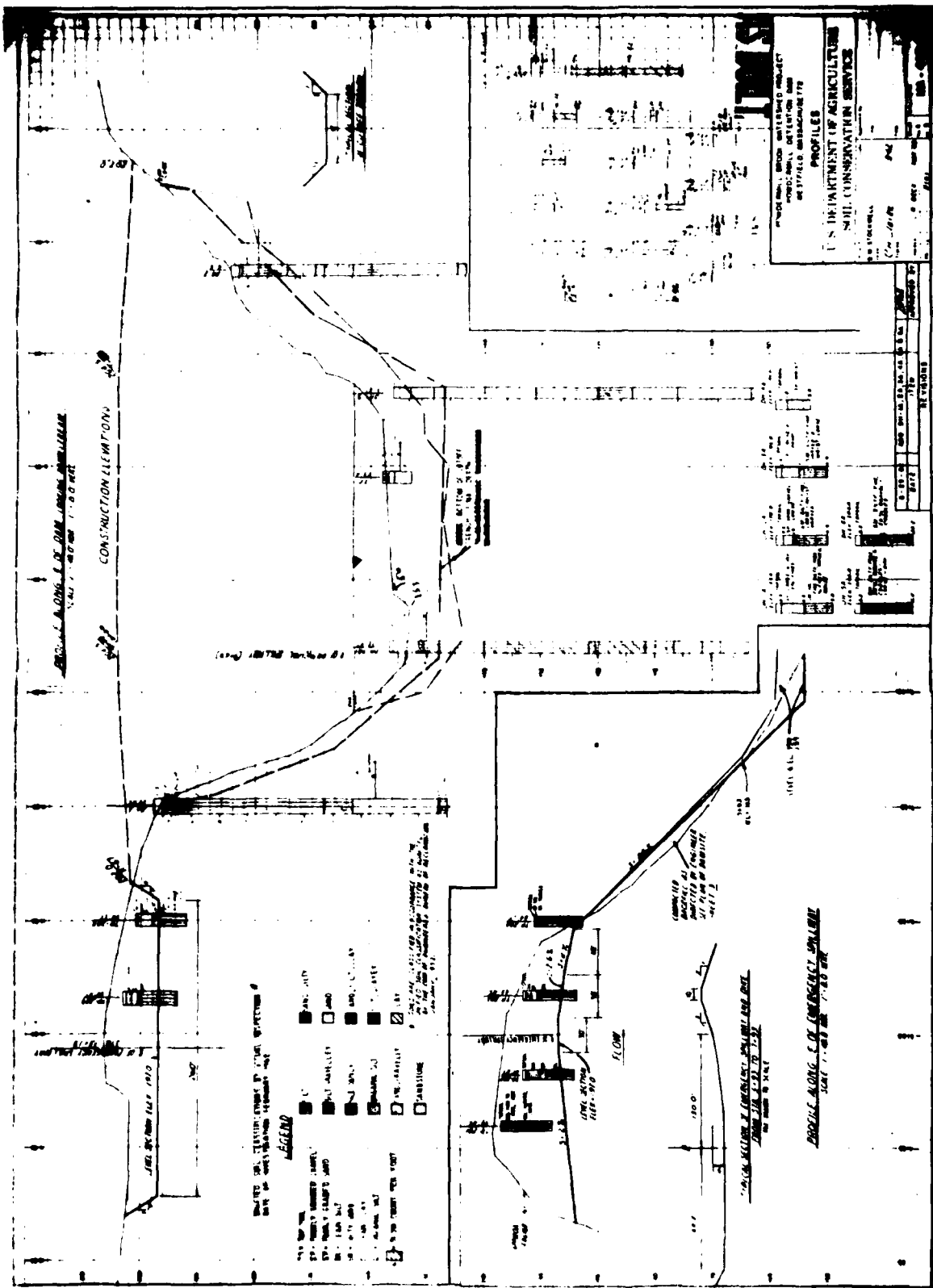
APPENDIX C

PHOTOGRAPHS









Reproduced from  
best available copy.









DAM NO. 2-7-329-13











Dam No. 2-7-329-15

Classification of Dam by Material:

Earth X Conc. Masonry \_\_\_\_\_ Stone Masonry \_\_\_\_\_  
Embankment \_\_\_\_\_  
Timber \_\_\_\_\_ Rockfill \_\_\_\_\_ Other \_\_\_\_\_

Dam Type: Gravity X Straight X Curved, Arched \_\_\_\_\_ Other \_\_\_\_\_  
Overflow \_\_\_\_\_ Non-overflow X

A. Description of present land usage downstream of dam:

15 % rural; 85 % ~~urban~~ developed

B. Is there a storage area or flood plain downstream of dam which could accommodate the impoundment in the event of a complete dam failure? Yes \_\_\_\_\_ No X - Not before developed area..

C. Character Downstream Valley: Narrow 50% Wide 50% Developed 85%  
Rural 15% Urban \_\_\_\_\_

Risk to life and property in event of complete failure.

No. of people 3

No. of homes 3

No. of businesses 2 - Retail

No. of industries 1 Type Sterling Radiator Company  
Telephone and electric distribution lines  
No. of utilities 4 Type sewer and water mains.

Railroads 2 - New York, New Haven and Hartford Railroad  
Boston and Albany Railroad.

Other dams None

Other Several Town Highway bridges and bridge carrying Routes 202 and 10.

Attach Sketch of dam to this form showing section and plan on  $8\frac{1}{2}$ " x 11" sheet.

3/vk /sd  
Attachments  
Locust Plan  
Sketches



DISTRICT II.

Submitted by Harold T. Shumway Dam No. 2-7-329-15  
Date January 15, 1974 City/~~2001~~ Westfield  
Name of Dam Powder Mill Brook Dam

Location: Topo Sheet No. 12A Mass. Rect. Coordinates N 420.000 E 260.700

Provide  $8\frac{1}{2}$ " x 11" in clear copy of topo map with location of Dam clearly indicated.

On Powder Mill Brook - accessible from Montgomery Street via Edgewood Street.

Use dirt road continuation of Edgewood Street parallel to power line.

Year built 1962 Year/s of subsequent repairs Unknown  
Built under provision of Public Law 566

Purpose of Dam: Water Supply \_\_\_\_\_ Recreational X  
Flood Control X Irrigation \_\_\_\_\_ Other Flood control and  
and wildlife develop-  
ment.

Drainage Area: 4.6 sq. mi. 2938 acres.  
Type: City, Bus. & Ind. 5% Dense Res. \_\_\_\_\_ Suburban 15% Rural, Farm 40%  
Wood & Scrub Land 40% Slope: Steep \_\_\_\_\_ Med. 20% Slight 80%

\* Normal Ponding Area: 5 Acres; Ave. Depth 3.5'  
Impoundment: 5.7 Million gals.; 17.5 acre ft.  
Silted in: Yes X No \_\_\_\_\_ Approx. Amount Storage Area 5%  
\* Note: Flood water capacity = 56 acres - 955 acre feet

No. and type of dwellings located adjacent to pond or reservoir None  
i.e. summer homes etc. \_\_\_\_\_

Dimensions of Dam: Length  $275'\pm$  of spillway  
 $650'\pm$  of dike Max. Height 47'  
Freeboard 39'  
Slopes: Upstream Face  $3\frac{1}{2}:1$   
Downstream Face 3:1 and  $3\frac{1}{2}:1$   
Width across top 18' to 20'



12.

## OVERALL CONDITION:

1. Safe X
2. Minor repairs needed \_\_\_\_\_
3. Conditionally safe - major repairs needed \_\_\_\_\_
4. Unsafe \_\_\_\_\_
5. Reservoir impoundment no longer exists (explain)  
Recommend removal from inspection list \_\_\_\_\_

13.

## REMARKS AND RECOMMENDATIONS: (Fully Explain)

The grade and alignment of this dam appeared good. Slopes appeared stable as did emergency spillway at easterly end of dam.

The concrete drop box inlet was in good condition with no spalling evident. However there was considerable trash or debris covering the rack over end of 36" diameter slide gate sluice. The slide gate was open but water flow was impeded by debris around rack. The water level was one foot below top or crest of drop box inlet openings which also were partially blocked by driftwood.

The dam appears safe at this time but the owner should be advised to clear debris from inlets and interior of concrete drop box before spring runoff.





PHOTO NO. 7 - Close up of outlet channel in wooded area  
below dam



## APPENDIX D

1. HYDROLOGIC COMPUTATION
2. DRAINAGE AREA



NO. 7  
E. 17  
BY



HAYDEN, HARDING & BUCHANAN, INC.  
CONSULTING ENGINEERS  
BOSTON, MASSACHUSETTS

SHEET NO. 1-  
JOB Dam Inspectn  
SUBJECT Powdermill  
CLIENT Corps

This dam was designed in 1962<sup>±</sup> by  
the U.S. Dept. of Agriculture  
Soils Conservation Service.

original design data was reviewed  
check design using PMF - Corps Guide  
Curves.



78-117

6/21/78



HAYDEN, HARDING & BUCHANAN, INC.  
CONSULTING ENGINEERS  
BOSTON, MASSACHUSETTS

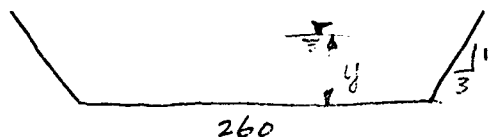
SHEET NO. 2

JOB Dam InspectionSUBJECT PowdermillCLIENT Corps of Eng

$$\text{Drainage Area} = 2938 \text{ acres} \\ = 2938 \text{ acres} \times 1.562 \times 10^{-3} \frac{\text{sq. miles}}{\text{acre}} = 4.6 \text{ sq. miles}$$

$$\text{MPF} = 2125 \text{ cfs / sq. mile}$$

$$= 2125 \times 4.6 = 9775 \text{ cfs} = Q_{PI}$$



$$R = \frac{A}{P} = \frac{(260 + 3y)y}{260 + 2y\sqrt{1+3^2}}$$

$$\text{at } V = 10 \text{ fps}$$

$$A = \frac{Q}{V} = 9775 / 10 = 977.5 \text{ sq ft.}$$

$$(260 + 3y)y = 977.5 \quad \text{get } y \approx 3.6 \text{ ft} \quad 977.5 \approx 977.5$$

Emergency Crest at El. 197.0

(Design High Water)

$$197.0 + 3.6 = 200.6 \approx 200.5$$

check S

$$V = (1.486/n) R^{2/3} S^{1/2}$$

$$R = \frac{(260 + 3 \times 3.6) 3.6}{260 + 2 \times 3.6 \sqrt{1+3^2}} = 3.44$$

$$10 = \frac{1.486}{0.012} (3.44)^{2/3} S^{1/2}$$

$$S = 0.012 < 2.6 \times 10^{-2}$$

no good



75-111

6-2-78

E. J. Blum

FBI



HAYDEN, HARDING & BUCHANAN, INC.  
CONSULTING ENGINEERS  
BOSTON, MASSACHUSETTS

SHEET NO. 3

JOB DAM InspectionSUBJECT Powder MillCLIENT Camp of Elm

$$V = 12$$

$$A = \frac{9775}{12} = 815 \text{ sq ft.}$$

$$(260 + 3y)y = 815 \quad \text{get } y = 3.04$$

$$R = \frac{(260 + 3 \times 3.04)3.04}{260 + 2 \times 3.04 \sqrt{1 + 3^2}} = 2.93$$

$$12 = \frac{1.486}{0.04} (2.93)^{2/3} S^{1/2}$$

$$S = 0.025 \approx 2.6 \times 10^{-2} \quad \text{OK.}$$

Emergency Crest @ El. 197.0

$$+ \frac{3.04}{200.04} \approx 0.015 \quad \text{OK.}$$

(Design High water)  
per calculation

From Calculation Sheet (Storage Capacity Curve).

$$\text{@ El. 200} \quad \text{Volume} = 1110 \text{ Acre Ft.}$$

$$\text{(@ El. 197)} \quad \text{Volume} = 970 \text{ Acre Ft.}$$

$$140 \text{ Acre Ft.} \leftarrow \text{Surcharge Storage Volume}$$

$$STCR_1 = \frac{140 \text{ Acre Ft.}}{938 \text{ Acre}} = 0.04765 \text{ Ft}$$

$$= 0.57 \text{ in.}$$

$$Q_{p2} = Q_{p1} \left(1 - \frac{0.57}{19}\right)$$

$$= 9775 \times 97. = 9482 \text{ cfs}$$





HAYDEN, HARDING & BUCHANAN, INC.  
CONSULTING ENGINEERS  
BOSTON, MASSACHUSETTS

SHEET NO. 4

JOB Dam Design  
SUBJECT Shaw-Down  
CLIENT Corps of Eng

(a)  $V = 12$

$$A = 948 \div 12 = 790. \text{ sq. ft.}$$

$$(260 + 3y)y = 790 \quad \text{get } y = 2.95$$

$$R = \frac{(260 + 3 \times 2.95)2.95}{260 + 2 \times 2.95 \sqrt{1 + 3^2}} = 2.85$$

$$12 = \frac{1.486}{0.04} (2.85)^{2/3} S^k$$

$$S = .258 \approx 2.6 \times 10^{-2} \checkmark \text{ OK}$$

(per calculation)

Emergency Crest @ El. 197.0

$$\begin{array}{r} 2.95 \checkmark \\ 197.0 \\ \hline 199.95 \end{array}$$

From calculation sheet (Storage capacity curve)

@ El. 199.95 Volume = 1100' Ave Ft

@ El. 197

$$\begin{array}{r} -) 970. \\ \hline 130 \text{ Ave Ft} \end{array}$$

$$STOR_2 = 130 \text{ Ave Ft} / 2938 = 0.04425 \text{ Ft}$$
$$= 0.53 \text{ in of Run off}$$

$$\text{Avg. } STOR = \frac{0.57 + 0.53}{2} = 0.55$$

$$\text{Resulting Peak Outflow } QP_3 = 9775 \left(1 - \frac{0.55}{19}\right)$$
$$= 9492 \text{ cfs.}$$



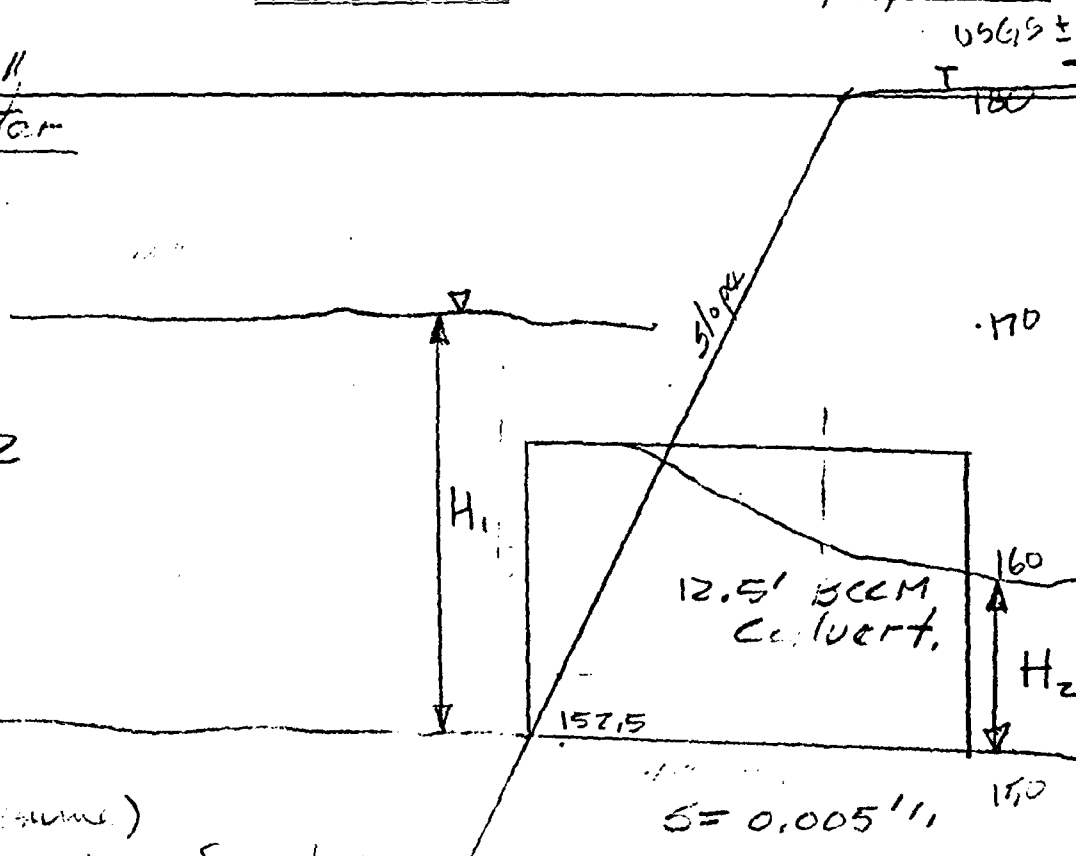
SHEET NO. 5-

JOB Plant Inspector

SUBJECT Robert L. ...

CLIENT CORP

Round mill  
Tailwater

$$Q = 9492$$


1st (assume)

$$n = 0.024 \pm \text{free disord.}$$
$$S = 0.00511 \text{ e}$$
$$\phi = 12.5^\circ \quad (\text{plan})$$

$\frac{1}{2}$  = 100% (100%)  
you want have less to 1 low full

$$L \approx 100' \pm (\text{from power})$$

$$D = 12.5 \quad A = \frac{\pi}{4} (12.5)^2 = 177.66 \text{ in}^2$$

$$C = \pi (12.5) = 39.25 \quad R = 3.125 \cdot R^{1.39} = 4.55$$

$$H_f = \frac{29 (1.24)^2 (100)}{4.55} \quad \frac{V^2}{2g} = .367 \frac{V^2}{7.5}$$

<u>V</u>	<u>V<sub>1/2</sub></u>	<u>H<sub>E</sub></u>	<u>H<sub>G</sub></u>	<u>H<sub>L</sub></u>	<u>Q</u>
10	1.553	1.55	.57	3.67	1227.
20	6.21	6.2	2.28	14.70	2454.
30	13.98	13.9	5.13	33.09	3681.
50	38.81	38.8	14.23	91.89	6135.
75	87.34	87.34	32.06	206.74	9767.
100	155.3	155.3	57.47	367.2	12270.

Can't develop  
this thread--will  
over-top rail  
road embankment.



## Check of Spillway Capacity Calculations

Use Broad crested weir Formula:

$$Q = CLH^{3/2} \quad H = \text{energy head} = \text{water height over crest (h)} + \text{velocity head (V}^2/2g)$$

$$H = h + V^2/2g$$

From previous calculations:  $h = 3.04'$ ,  $V = 12 \text{ fps}$  ✓

$$H = 3.04' + (12)^2/2g = 5.2' ✓$$

Use  $C = 3.2$  so ✓

$$Q = (3.2)(260)(5.2)^{1.5} = 9,865 \text{ cfs} > \text{PMF} = 9775 \text{ cfs}$$

In addition can pass about 400 cfs through outlet structures. ✓

∴ Spillway has the capacity to pass the PMF.

Flood discharges & elevations calculated by above are essentially the same as those determined by the normal depth solution. ✓

Spillway crest, at elevation 197.0', has about 3 ft of water flowing over it during PMF; thus PMF water surface, at elevation 200', will not overflow top of dam, which has an elevation of 202.0'.





HAYDEN, HARDING & BUCHANAN, INC.  
CONSULTING ENGINEERS  
BOSTON, MASSACHUSETTS

SHEET NO. 1

JOB Dam Repair  
SUBJECT Powder Mill Brook  
CLIENT COF NFD

Stage Discharge Data (C from King-Jer 10-12)

y	L	A	P	R	n	S	V	$V^{2/29}$	H	$H^{3/2}$	C	Q
1	260	260	262	0.99	.045	$2.67 \times 10^{-2}$	5.3	.44	1.44	1.73	3.28	1475
2	"	520	264	1.97	"	"	8.4	1.10	3.10	5.46	3.32	4713
3	"	780	266	2.93	"	"	10.9	1.84	4.84	10.65	3.46	9580
4	"	1040	268	3.88	"	"	13.1	2.66	6.66	17.19	3.54	16045
5	"	1300	270	4.81	"	"	15.2	3.59	8.59	25.18	3.65	23896



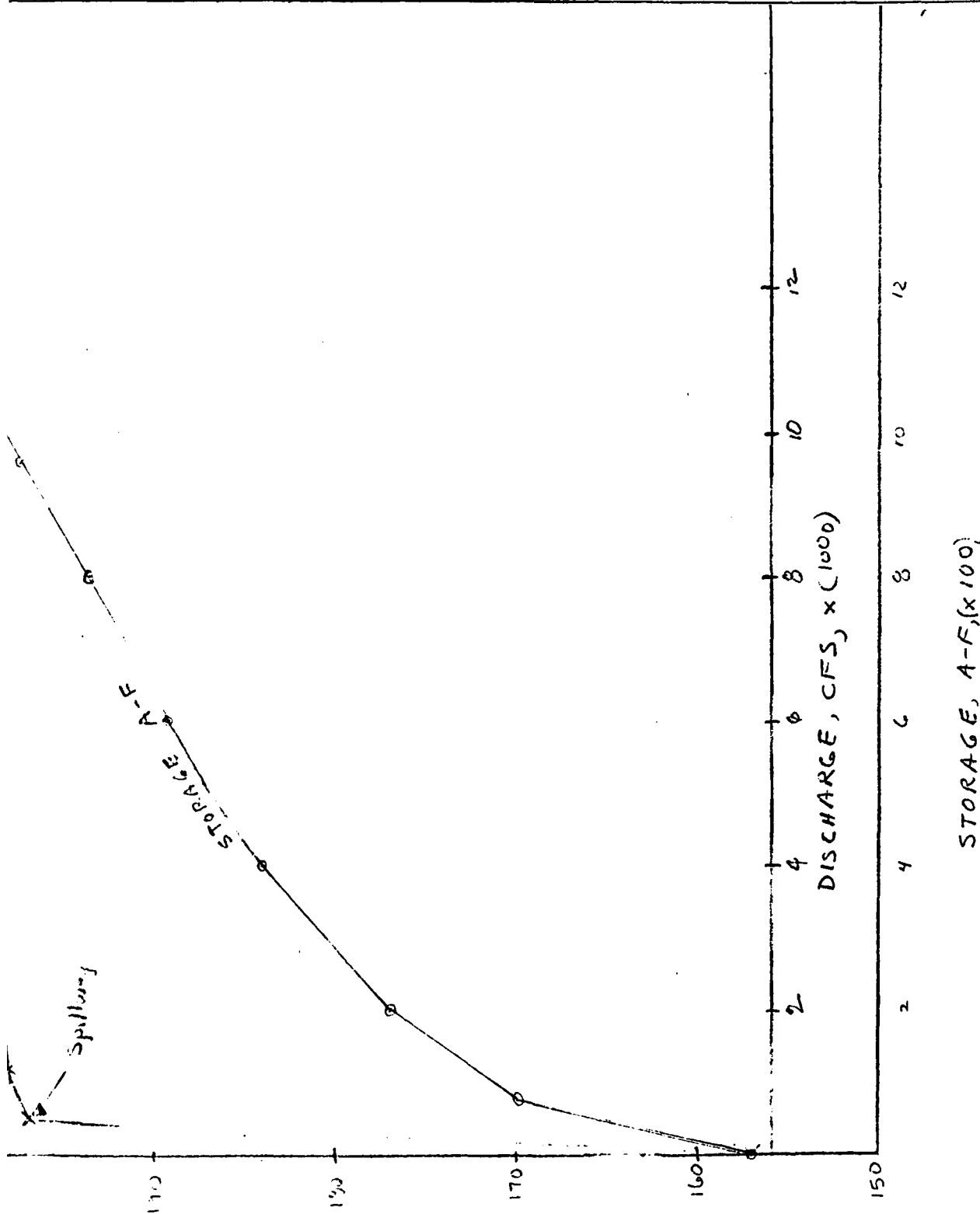


HAYDEN, HARDING & BUCHANAN, INC  
CONSULTING ENGINEERS  
BOSTON, MASSACHUSETTS

SHEET NO. 8

JOB Design of Flood Control  
SUBJECT Design of Flood Control  
CLIENT C&F MED

# STAGE DISCHARGE/STORAGE



STAGE, A-F, (x100)

DISCHARGE, CFS, x (1000)

STAGE, A-F, (x100)







**NAGE AREA**

Arm Brook Multiple Purpose Dam

PMF  
FLOOD  
LIMIT



APPENDIX E  
INFORMATION AS CONTAINED IN  
THE NATIONAL INVENTORY OF DAMS



STATE	IDENTITY	DIVISION	STATE	COUNTY	DATE	CONTRACT	NAME	LATITUDE	LONGITUDE	REPORT DATE
MA	025	NED	MA	013	01		POWDERMILL BROOK DAM	4209.2	7244.8	18 AUG 78

POPULAR NAME	NAME OF IMPOUNDMENT
--------------	---------------------

REGION BASIN	RIVER OR STREAM	NEAREST DOWNSTREAM CITY-TOWN-VILLAGE	DIST FROM DAM (MI.)	POPULATION
01 06	POWDERMILL BROOK	WESTFIELD	0	31433

TYPE OF DAM	YEAR COMPLETED	PURPOSES	STRUCTURAL HEIGHT (FT.)	IMPOUNDING CAPACITIES (ACRE-FT.)	ASBESTOS
REGC	1963	C	60	49	1160

DIST OWN  
 FED R  
 PRV/PED  
 SC8 A  
 VER/DATE  
 8  
 15 AUG 78

REMARKS
---------

SPILLWAY	MAXIMUM DISCHARGE (CFS)	VOLUME OF DAM (CY)	POWER CAPACITY (MW)	INSTALLED PROPOSED NO.	NAVIGATION LOCKS
942 J 260	9492	160000			

OWNER	ENGINEERING BY	CONSTRUCTION BY
CITY OF WESTFIELD	SOILS CONSERVATION SERV	COMM OF MA WATER RES COM

DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE
NONE	NONE	NONE	NONE

INSPECTION BY	INSPECTION DATE	AUTHORITY FOR INSPECTION
HAYDEN, HARDING + BUCHANAN, INC	31 MAY 78	PL 92-367

REMARKS
---------